

NOTES:

1. WATER METER SUPPLIED AND INSTALLED BY THE CITY.
2. ALL SERVICE SADDLES SHALL HAVE RUBBER GASKET AND I.P. THREADS.
3. A 24" HORIZONTAL WAVE SHALL BE AT THE CONNECTION TO THE NEW MAIN.
4. NO SPLICES OR CRIMPING OF SERVICE LINE SHALL BE MADE.
5. SERVICE LINE SHALL BE PERPENDICULAR TO THE MAIN AND 30° MIN. COVER UNLESS OTHERWISE APPROVED BY THE ENGINEER.
6. METER BOX SHALL BE SET SQUARE TO THE BACK OF CURB WITH WATER METER CENTERED IN BOX. FOR INSTALLATION IN SIDEWALK, PLACE EXPANSION JOINTS A MIN. OF 6" BETWEEN BOX AND JOINT.
7. STAINLESS STEEL INSERTS REQUIRED FOR ALL COMPRESSION FITTINGS. TIGHTEN TO STOP. (NO PACK JOINTS)
8. GROUND LEVEL INSIDE METER BOX SHOULD BE UP TO BOTTOM OF METER STOP.
9. TAPS ON NON-METAL PIPE SHALL BE STAGGERED WITH 12" SEPARATION.
10. ALL WATER METERS UP TO 2" ARE TO BE BACKFILLED WITH 5/8" MINUS CRUSHED ROCK UP TO THE BOTTOM OF THE METER AND THE REMAINING AREA UP TO THE TOP OF THE REGISTER WITH ACCEPTED INSULATING MATERIAL, CLEAN CEDAR WOOD SHAVINGS.
11. PROVIDE A 3' UNOBSTRUCTED CLEAR AREA AROUND THE METER.
12. CONTRACTOR WILL BE RESPONSIBLE TO PROTECT WATER SERVICES FROM FREEZING DURING CONSTRUCTION.
13. USE DIFFERENT COLOR TRACER WIRE ON CUSTOMER SIDE IF IN COMMON TRENCH.

* (OR APPROVED EQUAL)

14. IF 5/8" X 3/4" METER IS USED INSTEAD OF 1" METER, THE METER ADAPTORS ARE REQUIRED.
15. NO LEAD ON ALL BRASS FITTINGS
16. METER SPACER SHALL BE PROVIDED BY CITY INSPECTOR PRIOR TO METER SETTER INSTALLATION
17. A BALL VALVE IS REQUIRED TO BE INSTALLED ON CUSTOMER SIDE OF METER SETTER POLY LINE (TYPICALLY IN GARAGE) IN THE OFF POSITION FOR THE CITY STAFF SO THAT WATER METER CAN BE TESTED FOR LEAKS. THIS IS REQUIRED BEFORE THE CITY CAN INSTALL A WATER METER AS A PART OF THE METER ASSEMBLY INSPECTION.
18. METER SPACER PROVIDED BY CITY INSPECTOR PRIOR TO SETTER INSTALLATION.

DETAIL NOTES:

- ① METER BOX: MID STATES #MSBCF1324-12 w/#1324 DI RDR LID* OR ARMORCAST 13" X 24" X 12" POLYMER CONCRETE BOX WITH 13" X 24" X 2" POLYMER CONCRETE COVER*.
- ② 1" SETTER: A.Y. McDONALD WITH FULL PORT BALL VALVE AND CHECK VALVE #762P415WCDD44x15 OR FORD VBH94-15W-11-44-NL-FP OR MUELLAR 391B241042-74N.
- ③ 1" BALL VALVE: A.Y. McDONALD CORP-STOP #73131B* OR FORD FB 500-4-NL MIPT X MIPT
- ④ 1" ADAPTER: A.Y. McDONALD #747543Q*.
- ⑤ 1" IPS SERVICE LINE: 200 PSI GRADE PE 3408 POLYETHYLENE WRAPPED WITH SOLID CORE 10 GAUGE COATED COPPER WIRE EXTENDING 12" OUT OF BOX.
- ⑥ 1" ADAPTER: A.Y. McDONALD #747533Q*.
- ⑦ 5/8" X 3/4" TO 1" METER ADAPTORS. FORD #A-24NL OR AY MCDONALD 710 J24*



City of Bothell
PUBLIC WORKS DEPARTMENT

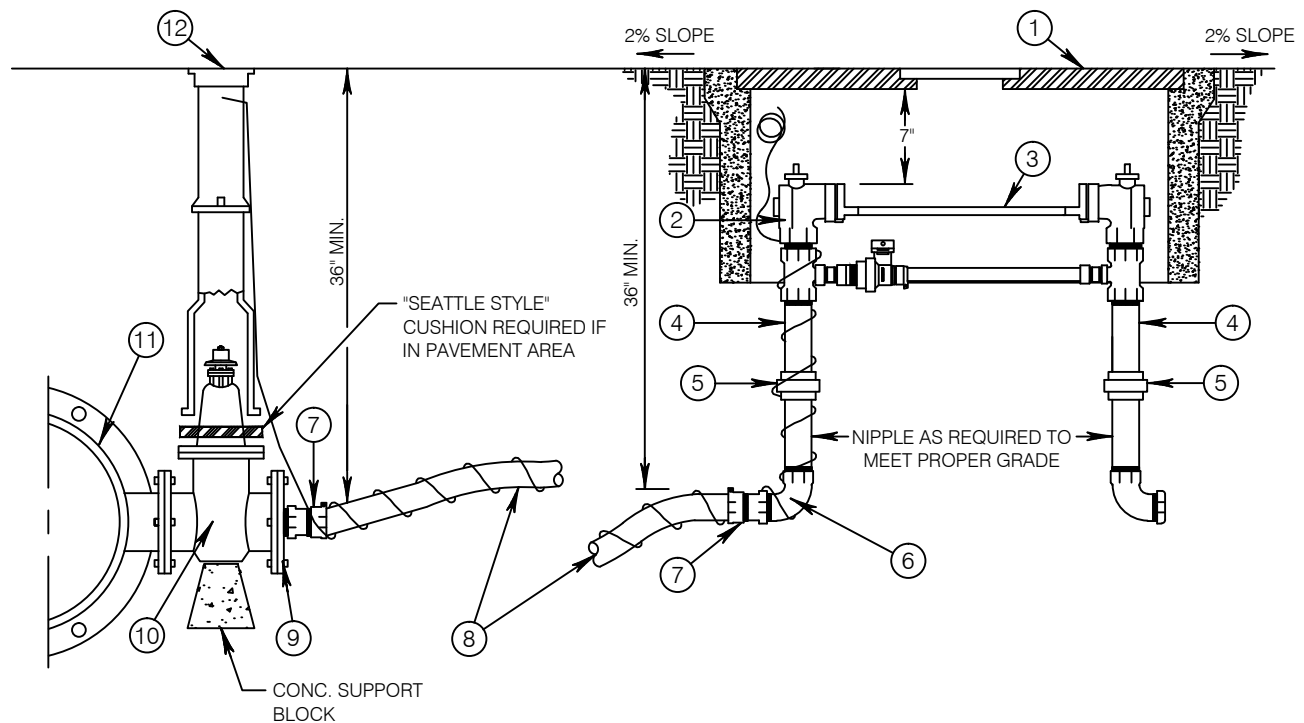
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City Engineer

**1" WATER SERVICE
ASSEMBLY**

Standard
Detail

510

Revision Date
Jul, 2014



NOTES:

1. WATER METER SUPPLIED AND INSTALLED BY THE CITY.
2. A 24" HORIZONTAL WAVE SHALL BE AT THE CONNECTION TO THE NEW MAIN.
3. NO SPLICES OR CRIMPING OF SERVICE LINE SHALL BE MADE.
4. SERVICE LINE SHALL BE PERPENDICULAR TO THE MAIN AND 30" MIN. COVER UNLESS OTHERWISE APPROVED BY THE ENGINEER.
5. METER BOX SHALL BE SET SQUARE TO THE BACK OF CURB WITH WATER METER CENTERED IN THE BOX. FOR INSTALLATION IN SIDEWALK, PLACE EXPANSION JOINTS A MIN. OF 6" BETWEEN BOX AND JOINT.
6. SETTER INSTALLATION SHALL PROVIDE ADEQUATE CLEARANCE BETWEEN BYPASS AND METER BOX WALL FOR OPERATING AND LOCKING BYPASS VALVE
7. STAINLESS STEEL INSERTS REQUIRED FOR ALL PACK JOINTS (COMPRESSION TYPE) FITTINGS.
8. GROUND LEVEL INSIDE METER BOX SHOULD BE UP TO BOTTOM OF METER STOP.
9. ALL WATER METERS UP TO 2" ARE TO BE BACKFILLED WITH $\frac{5}{8}$ " MINUS CRUSHED ROCK UP TO THE BOTTOM OF THE METER AND THE REMAINING AREA UP TO THE TOP OF THE REGISTER WITH ACCEPTED INSULATING MATERIAL, MEDIUM BARK OR SAW DUST.
10. PROVIDE A 3 FEET UNOBSTRUCTED CLEAR AREA AROUND THE METER.
11. CONTRACTOR WILL BE REponsible TO PROTECT WATER SERVICES FROM FREEZING DURING CONSTRUCTION.
12. USE DIFFERENT COLOR TRACER WIRE ON CUSTOMER SIDE IF IN COMMON TRENCH.

* (OR APPROVED EQUAL)

DETAIL NOTES:

- ① METER BOX: MID STATES #MSBCF1730-12 w/#1730 DI LID OR ARMORCAST 17" X 30" X 12" POLYMER CONCRETE BOX WITH 17" X 30" X 2" RPM COVER W/READ LID*.
- ② 1 $\frac{1}{2}$ " SETTER: FORD #VBB86-C11290-01-NL OR AY MCDONALD 730F608WWFF 666 OR MUELLER 695B2427N.
- ③ RIDGE METER SPREADER: SUPPLIED BY CONTRACTOR.
- ④ 1 $\frac{1}{2}$ " NIPPLE: BRASS, 4" LONG MIPT x MIPT.
- ⑤ 1 $\frac{1}{2}$ " UNION: BRASS.
- ⑥ 1 $\frac{1}{2}$ " 90° ELBOW: BRASS.
- ⑦ 1 $\frac{1}{2}$ " COUPLING: MIPT x PACK JOINT COMPRESSION AY MCDONALD FITTING #74753-33*
- ⑧ 1 $\frac{1}{2}$ " IPS SERVICE LINE: 200 PSI GRADE 3408 POLYETHYLENE WRAPPED WITH 10 GAUGE COATED SOLID CORE COPPER WIRE 12" OUT OF THE BOX.
- ⑨ 4" REDUCER: COMPANION FLANGE WITH 1 $\frac{1}{2}$ " TAP.
- ⑩ 4" GATE VALVE: FL x FL (SEE SECTION 5-10.6)
- ⑪ WATER MAIN TEE: DUCTILE IRON WITH 4" BRANCH, MJ x FL (ON NEW MAINS) TAPPING TEE WITH 4" BRANCH, FL (ON EXISTING MAINS).
- ⑫ VALVE BOX: EAST JORDAN 8555* (SEE STD DETAIL 527)
NO LEAD ON ALL BRASS FITTINGS



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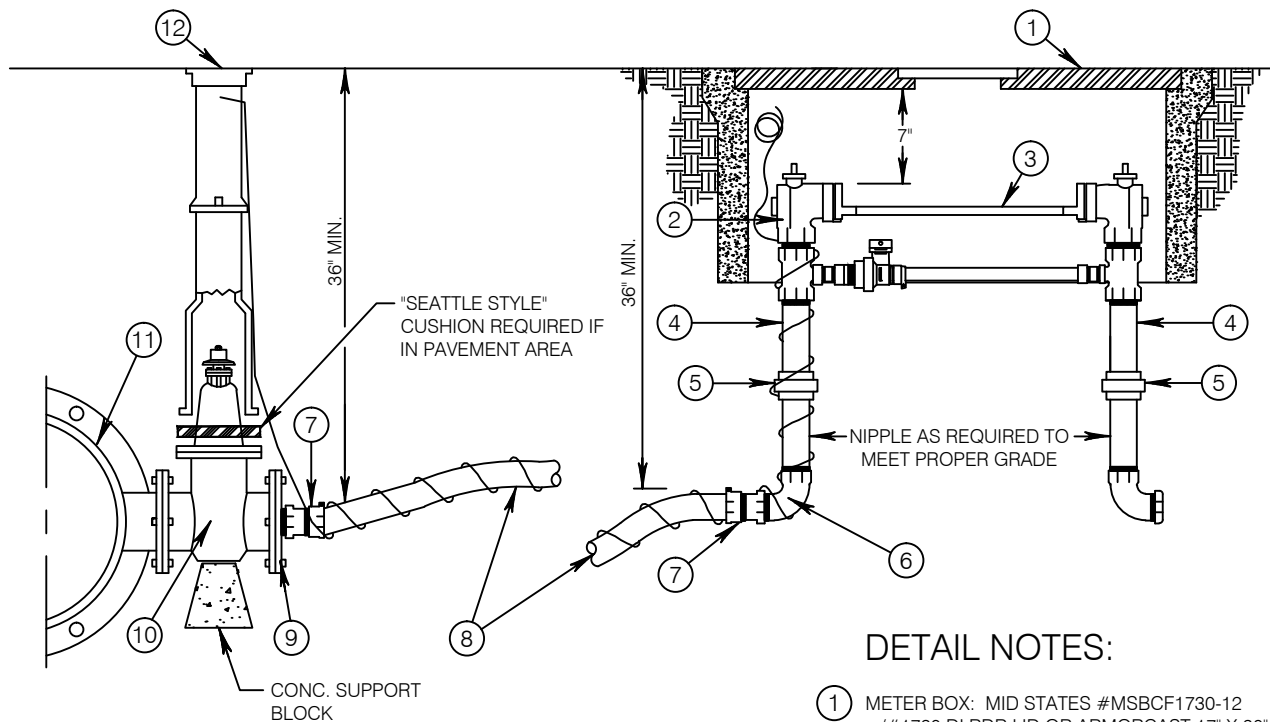
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City Engineer

**1 1/2" WATER SERVICE
ASSEMBLY**

Detail

514

Revision Date
Jun, 2015



NOTES:

1. WATER METER SUPPLIED AND INSTALLED BY THE CITY.
2. A 24" HORIZONTAL WAVE SHALL BE AT THE CONNECTION TO THE NEW MAIN.
3. NO SPLICES OR CRIMPING OF SERVICE LINE SHALL BE MADE.
4. SERVICE LINE SHALL BE PERPENDICULAR TO THE MAIN AND 30" MIN. COVER UNLESS OTHERWISE APPROVED BY THE ENGINEER.
5. METER BOX SHALL BE SET SQUARE TO THE BACK OF CURB WITH THE WATER METER CENTERED IN THE BOX. FOR INSTALLATION IN SIDEWALK, PLACE EXPANSION JOINTS A MIN. OF 6" BETWEEN BOX AND JOINT.
6. SETTER INSTALLATION SHALL PROVIDE ADEQUATE CLEARANCE BETWEEN BYPASS AND METER BOX WALL FOR OPERATING AND LOCKING BYPASS VALVE.
7. STAINLESS STEEL INSERTS REQUIRED FOR ALL PACK JOINTS (COMPRESSION TYPE) FITTINGS.
8. GROUND LEVEL INSIDE METER BOX SHOULD BE UP TO BOTTOM OF METER STOP.
9. ALL WATER METERS UP TO 2" ARE TO BE BACKFILLED WITH $\frac{5}{8}$ " MINUS CRUSHED ROCK UP TO THE BOTTOM OF THE METER AND THE REMAINING AREA UP TO THE TOP OF THE REGISTER WITH ACCEPTED INSULATING MATERIAL, MEDIUM BARK OR SAW DUST.
10. PROVIDE A 3' UNOBSTRUCTED CLEAR AREA AROUND THE METER.
11. CONTRACTOR WILL BE RESPONSIBLE TO PROTECT WATER SERVICES FROM FREEZING DURING CONSTRUCTION.
12. USE DIFFERENT COLOR TRACER WIRE ON CUSTOMER SIDE IF IN COMMON TRENCH.

* (OR APPROVED EQUAL)

DETAIL NOTES:

- ① METER BOX: MID STATES #MSBCF1730-12 w/#1730 DI RDR LID OR ARMORCAST 17" X 30" X 12" POLYMER CONCRETE BOX WITH 17" X 30" X 2" RPM COVER W/READ LID*.
- ② 2" SETTER: FORD #VBB87-C11291-01-NL OR AY MCDONALD 730F708WWFF776 OR MUELLER 105B2427N.
- ③ RIDGE METER SPREADER: SUPPLIED BY CONTRACTOR.
- ④ 2" NIPPLE: BRASS, 4" LONG MIPT x MIPT.
- ⑤ 2" UNION: BRASS.
- ⑥ 2" 90° ELBOW: BRASS.
- ⑦ 2" COUPLING: MIPT x PACK JOINT COMPRESSION AY MCDONALD FITTING #74753-33*
- ⑧ 2" IPS SERVICE LINE: 200 PSI GRADE 3408 POLYETHYLENE WRAPPED WITH 10 GAUGE COATED SOLID CORE COPPER WIRE 12" OUT OF THE BOX.
- ⑨ 4" REDUCER: COMPANION FLANGE WITH 2" TAP.
- ⑩ 4" GATE VALVE: FL x FL (SEE SECTION 5-10.6)
- ⑪ WATER MAIN TEE: DUCTILE IRON WITH 4" BRANCH, MJ x FL (ON NEW MAINS) TAPPING TEE WITH 4" BRANCH, FL (ON EXISTING MAINS).
- ⑫ VALVE BOX: EAST JORDAN 8555* (SEE STD DETAIL 527)
- ⑬ IF METER BEING USED IS SMALLER THAN 2" THEN APPROPRIATE SIZED METER ADAPTORS ARE TO BE SUPPLIED BY THE CONTRACTOR

NO LEAD ON ALL BRASS FITTINGS



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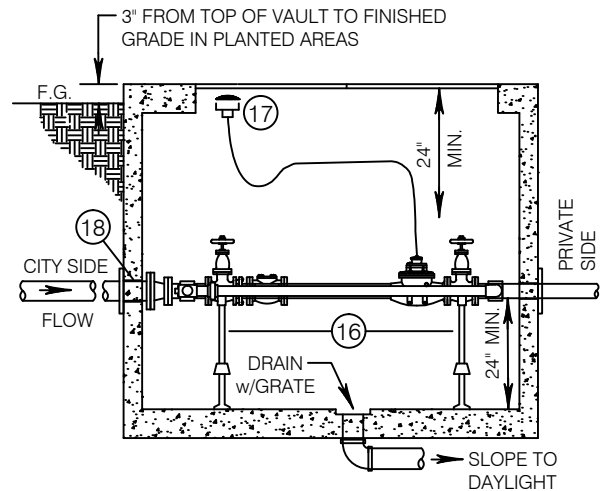
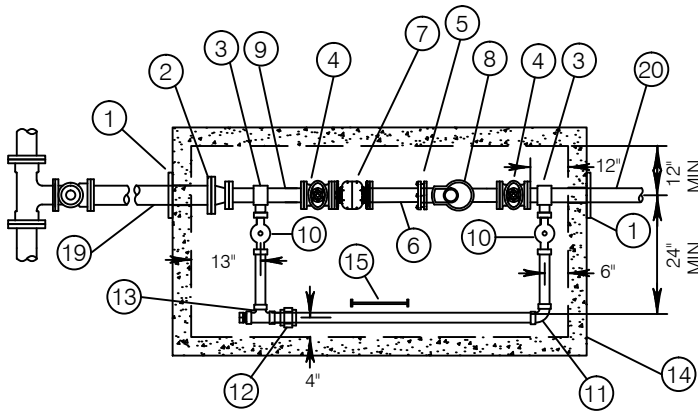
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City Engineer

**2" WATER SERVICE
ASSEMBLY**

Standard
Detail

515

Revision Date
Jun, 2015



MATERIALS LIST:

- ① SET SCREW RETAINER GLAND.
- ② 4" x 3" REDUCER: DUCTILE IRON FL x FL.
- ③ EPOXY COATED SERVICE SADDLE: STAINLESS STEEL DOUBLE STRAP WITH 2" IPS TAP.
- ④ 3" GATE VALVE: FL x FL (SEE SECTION 5-9.6).
- ⑤ 3" FLANGE ADAPTOR: DUCTILE IRON. SET SCREW RETAINER GLAND
- ⑥ 3" PIPE SPOOL: CL52 DI, FL x PE, LENGTH TO FIT (15" MIN).
- ⑦ 3" METER BADGER STRAINER: #BAD STRAINER-3-NSF61
- ⑧ 3" METER: BADGER COMPOUND w/CROSSOVER: #BADGER COMP3-R-1C61-F-40-2550-BOTHELL 3"
- ⑨ 3" PIPE SPOOL CL 52 DI FL x FL 12" LENGTH
- ⑩ 2" BALL VALVE: BRASS, FORD #B11-666W-NL OR B11-777W-NL w/PADLOCK WING OR LOCK CAP*..
- ⑪ 2" 90° ELBOW: BRASS.
- ⑫ 2" UNION: BRASS, THREADED
- ⑬ 2" TEE: BRASS, THREADED w/PLUG.
- ⑭ VAULT: UTILITY VAULT CO. #4484, PRE CAST CONCRETE w/TOP SECTION #4484-TL-2-332P (TWO 3'x 3' DIAMOND PLATE DOORS RATED FOR H-20 LOADING).
- ⑮ LADDER: GALV WITH PULL-UP EXTENDER, BOLTED TO VAULT FLOOR AND WALL IN ALIGNMENT WITH VAULT OPENING. (SEE DETAIL 590).
- ⑯ ADJUSTABLE PIPE STANCHIONS: 2 EACH ON MAINLINE AND BY-PASS ASSEMBLY.
- ⑰ METER SENSOR: ORION REMOTE DATA PROFILE TRANSMITTER (MOUNT TO VAULT WALL).
- ⑱ LINK SEALOR APPROVED EQUAL.
- ⑲ 4" PIPE SPOOL CL 52 DI FLxPE LENGTH TO FIT MINIMUM 24"
- ⑳ 3" PIPE SPOOL CL 52 DI FL x PE MINIMUM 30"

NO LEAD ON ALL BRASS FITTINGS

NOTES:

- 1 ALL MATERIALS, INCLUDING METER SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR.
2. NEW CONSTRUCTION- DI TEE WITH 4" BRANCH, MJ x FL, 4" GATE VALVE, FL x FL EXISTING CONNECTION USE DETAIL 545 TO FLEX. CPLG OR RED.
3. ALL METERS TO READ IN CUBIC FEET.
4. PROVIDE 24" - 36" CLEARANCE BETWEEN VAULT FLOOR AND BOTTOM OF COMPOUND METER. WHERE ELEVATION OF VAULT FLOOR IS TOO LOW TO DRAIN TO DAYLIGHT OR STORM SYSTEM, THIS CLEARANCE CAN BE REDUCED TO A MINIMUM OF 12", IF SUBSTITUTION OF A SHORTER VAULT ALLOWS FLOOR TO DRAIN TO DAYLIGHT OR STORM SYSTEM (APPROVED BY THE CITY ENGINEER ON A CASE BY CASE BASIS ONLY).
5. VAULT COVER SHALL INCLUDE 2 LOCKING STEEL DOORS (GALVANIZED DIAMOND PLATE). DOORS SHALL BE CAST IN COVER WITH 8" SPECIAL OFFSET FROM VAULT WALL, AS SHOWN.
6. VAULTS SHALL NOT BE INSTALLED IN AREAS WITH VEHICULAR TRAFFIC.
7. ALL PIPE THROUGH VAULT SHALL BE CORE DRILLED AND HAVE A "LINK SEAL"*.
* (OR APPROVED EQUAL)
8. VAULT DRAINAGE PROCEDURE SHALL BE AS FOLLOWS:
A) VAULT DRAIN TO DAYLIGHT.
B) VAULT DRAIN TO STORM DRAIN SYSTEM (IF POSSIBLE).
C) IF NO POSSIBLE MENAS OF GRAVITY DRAIN, (SEE STD DETAIL 593) FOR SUMP PUMP INSTALLATION.



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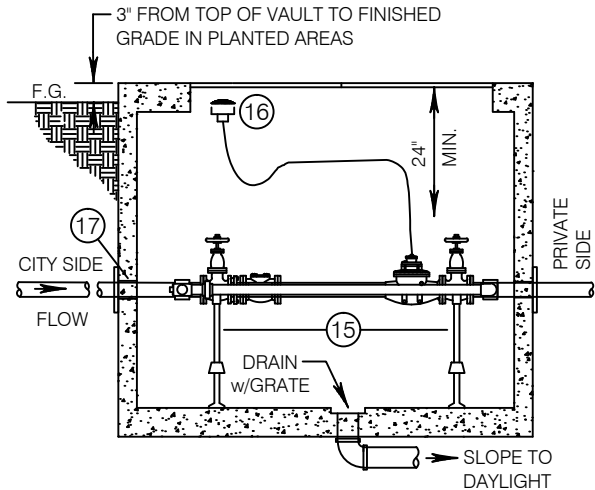
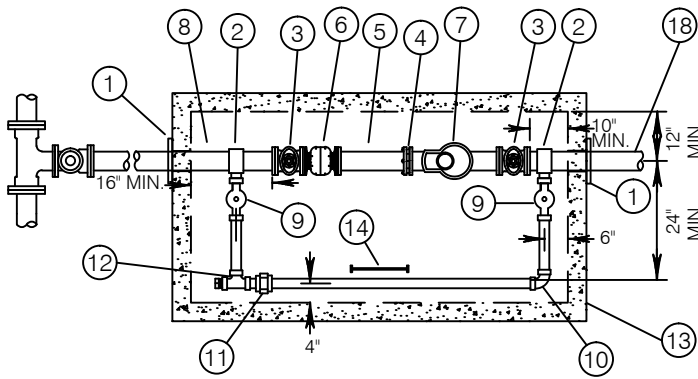
City Engineer

**3" DOMESTIC
WATER SERVICE**

Standard
Detail

516

Revision Date
Jun, 2015



MATERIALS LIST:

- ① SET SCREW RETAINER GLAND.
 - ② EPOXY COATED SERVICE SADDLE (4") : STAINLESS STEEL DOUBLE STRAP WITH 2" IPS TAP.
 - ③ 4" GATE VALVE: FL x FL (SEE SECTION 5-9.6).
 - ④ 4" FLANGE ADAPTOR: DUCTILE IRON. RESTRAINED FLANGE COUPLING ADAPTOR (RFCA)
 - ⑤ 4" PIPE SPOOL: CL52 DI, FL x PE, LENGTH TO FIT (20" MIN).
 - ⑥ 4" METER BADGER STRAINER: BAD STRAINER-4-NSF61
 - ⑦ 4" METER: BADGER COMPOUND w/CROSSOVER:
#BADGER COMP4-R-1C61-F-40-2550-BOTHELL 4"
 - ⑧ 4" PIPE SPOOL: CL52 DI, FL x PE, MIN 36".
 - ⑨ 2" BALL VALVE: BRASS, FORD #B11-666W-NL OR B11-777W-NL w/PADLOCK WING OR LOCK CAP*..
 - ⑩ 2" 90° ELBOW: BRASS.
 - ⑪ 2" UNION: BRASS, THREADED
 - ⑫ 2" TEE: BRASS, THREADED w/PLUG.
 - ⑬ VAULT: UTILITY VAULT CO. #4484, PRE CAST CONCRETE w/TOP SECTION #4484-TL-2-332P (TWO 3'x 3' DIAMOND PLATE DOORS RATED FOR H-20 LOADING).
 - ⑭ LADDER: GALV WITH PULL-UP EXTENDER, BOLTED TO VAULT FLOOR AND WALL IN ALIGNMENT WITH VAULT OPENING. (SEE STD DETAIL 590).
 - ⑮ ADJUSTABLE PIPE STANCHIONS: 2 EACH ON MAINLINE AND BY-PASS ASSEMBLY.
 - ⑯ METER SENSOR: ORION REMOTE DATA PROFILE TRANSMITTER (MOUNT TO VAULT WALL).
 - ⑰ LINK SEAL OR APPROVED EQUAL.
 - ⑱ 4" PIPE SPOOL CL52 DI FL x PE MIN 30"
- NO LEAD ON ALL BRASS FITTINGS

NOTES:

1. ALL MATERIALS, INCLUDING METER SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR.
2. NEW CONSTRUCTION- DI TEE WITH 4" BRANCH, MJ x FL, 4" GATE VALVE, FL x FL EXISTING CONNECTION USE DETAIL 545 TO FLEX. CPLG OR RED.
3. ALL METERS TO READ IN CUBIC FEET.
4. PROVIDE 24" - 36" CLEARANCE BETWEEN VAULT FLOOR AND BOTTOM OF COMPOUND METER. WHERE ELEVATION OF VAULT FLOOR IS TOO LOW TO DRAIN TO DAYLIGHT OR STORM SYSTEM, THIS CLEARANCE CAN BE REDUCED TO A MINIMUM OF 12", IF SUBSTITUTION OF A SHORTER VAULT ALLOWS FLOOR TO DRAIN TO DAYLIGHT OR STORM SYSTEM (APPROVED BY THE CITY ENGINEER ON A CASE BY CASE BASIS ONLY).
5. VAULT COVER SHALL INCLUDE 2 LOCKING STEEL DOORS (GALVANIZED DIAMOND PLATE). DOORS SHALL BE CAST IN COVER WITH 8" SPECIAL OFFSET FROM VAULT WALL, AS SHOWN.
6. VAULTS SHALL NOT BE INSTALLED IN AREAS WITH VEHICULAR TRAFFIC.
7. ALL PIPE THROUGH VAULT SHALL BE CORE DRILLED AND HAVE A "LINK SEAL"*.
8. VAULT DRAINAGE PROCEDURE SHALL BE AS FOLLOWS:
A) VAULT DRAIN TO DAYLIGHT.
B) VAULT DRAIN TO STORM DRAIN SYSTEM (IF POSSIBLE).
C) IF NO POSSIBLE MEANS OF GRAVITY DRAIN, (SEE STD DETAIL 593) FOR SUMP PUMP INSTALLATION.

* (OR APPROVED EQUAL)



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PUBLIC WORKS DEPARTMENT

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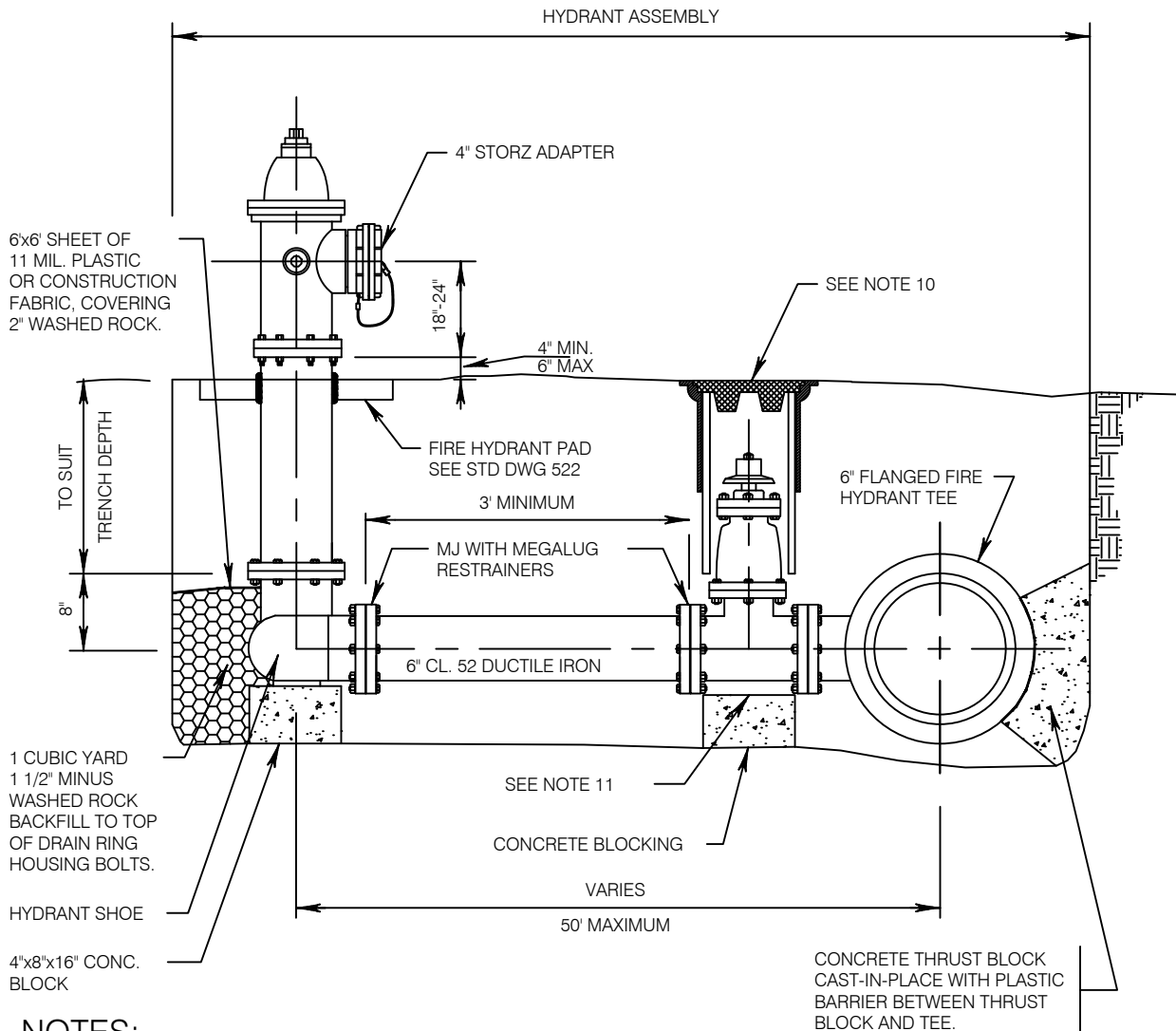
City Engineer

**4" DOMESTIC
WATER SERVICE**

Standard
Detail

517

Revision Date
Jun, 2015



NOTES:

- HYDRANTS AND ALL MATERIALS AS SPECIFIED.
- ACCEPTABLE HYDRANTS:
CLOW MEDALLION, M AND H STYLE 929, MUELLER SUPER CENTURION 200, AVK, AND AMERICAN DARLING B-62-B, EAST JORDAN 5CD250 WATERMASTER #71614D.
- PAINT HYDRANT: TWO BRUSHED (NO SPRAY PAINT) COATS OF RUSTOLEUM HIGH GLOSS WHITE. (EXCEPT STORZ ADAPTER)
- CONTRACTOR TO STENCIL IN 3" BLACK PAINT NUMBERS ON THE BARREL OF THE HYDRANT, FACING THE HYDRANT VALVE, LISTING THE DISTANCE FROM THE CENTER OF THE HYDRANT TO THE HYDRANT VALVE.
- KING CO. F.H. ASSEMBLY:
(2)-2 1/2" HOSE PORTS WITH N.S.T. (1)-4" PUMPER WITH S.S.T. AND 4" STORZ ADAPTER ASSEMBLY.
SNOHOMISH CO. F.H. ASSEMBLY:
(2)-2 1/2" HOSE PORTS WITH N.S.T. (1)-4 1/2" PUMPER WITH N.S.T. AND 4" STORZ ADAPTER ASSEMBLY.
PUMPER OUTLET TO BE FACING THE STREET.
- IF HYDRANT IS LOCATED IN CONCRETE, USE EXPANSION MATERIAL AROUND THE BARREL AND PROVIDE A 5' CLEARANCE FOR HANDICAP MANEUVERABILITY.
- HYDRANTS SUBJECT TO TRAFFIC INTERFERENCE SHALL HAVE GUARD POSTS PER STD DETAILS 524.
- CLEAR ZONE PER STD DETAIL 524
- ALL PIPING TO BE RESTRAINED
- VALVE BOX PER STD DETAIL 527.
- 6" RESILIENT WEDGE GATE VALVE. (SEE BOTHELL DESIGN AND CONSTRUCTION STANDARDS DECTION 5-10.6).
- SEE STD DETAIL 523 FOR PAVEMENT MARKING.



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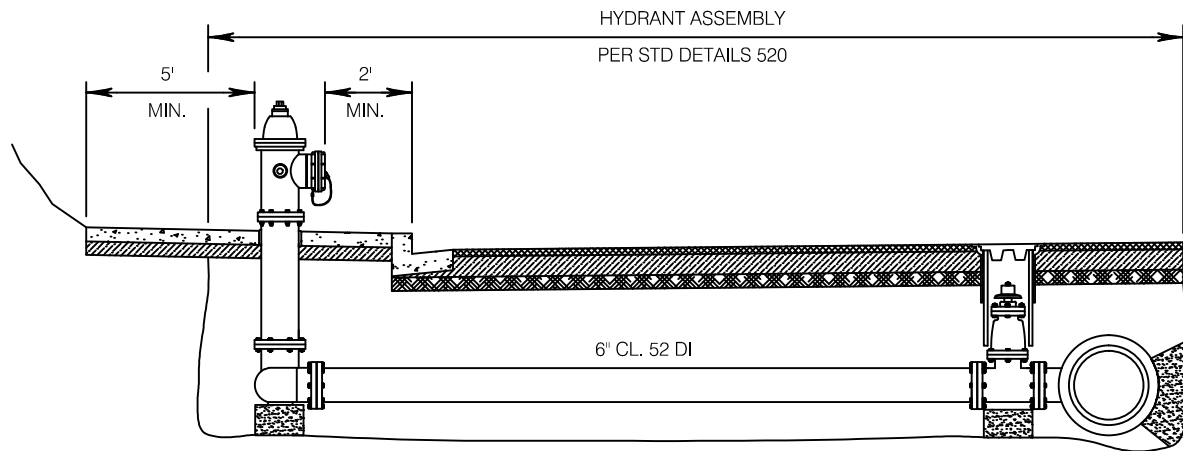
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City Engineer

FIRE HYDRANT ASSEMBLY

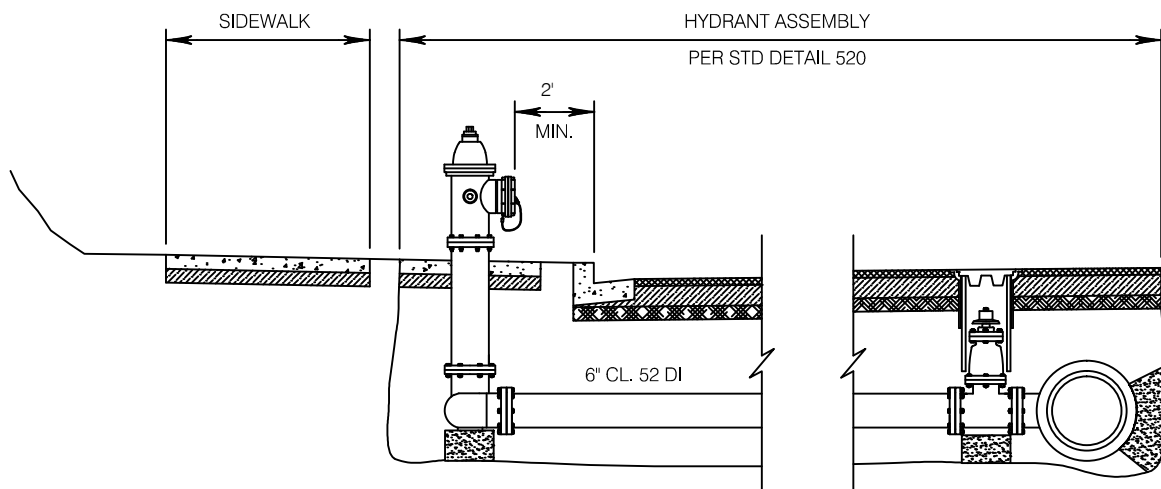
Standard
Detail

520

Revision Date
Dec, 2016



TYPICAL SECTION
IN SIDEWALK



TYPICAL SECTION
IN PLANTER

NOTES:

1. WHERE 8' SIDEWALK IS NOT POSSIBLE, REDUCE 2' MIN. CURB SETBACK TO 6" AND ADD GUARD POSTS.
2. FOR FIRE HYDRANT GENERAL CONSTRUCTION, SEE NOTES ON STD DETAIL 520.
3. HYDRANT PAD TO BE CONSTRUCTED AT GRADE. NO SOIL CUT AROUND HYDRANT TO MEET MINIMUM HEIGHT STANDARD.



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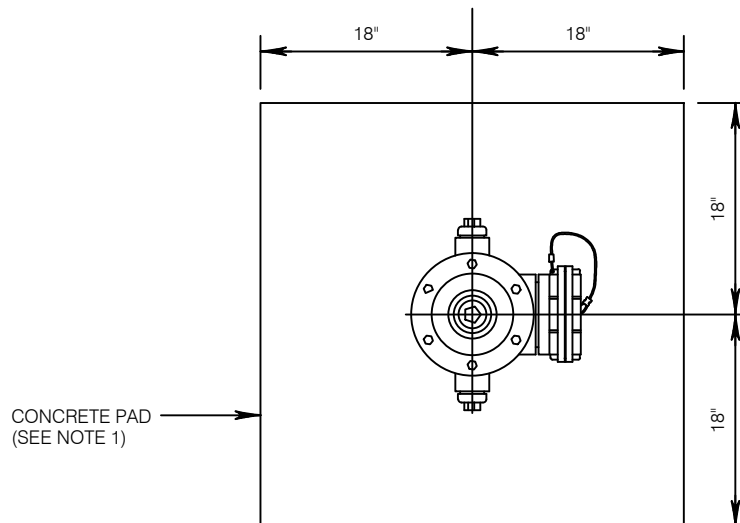
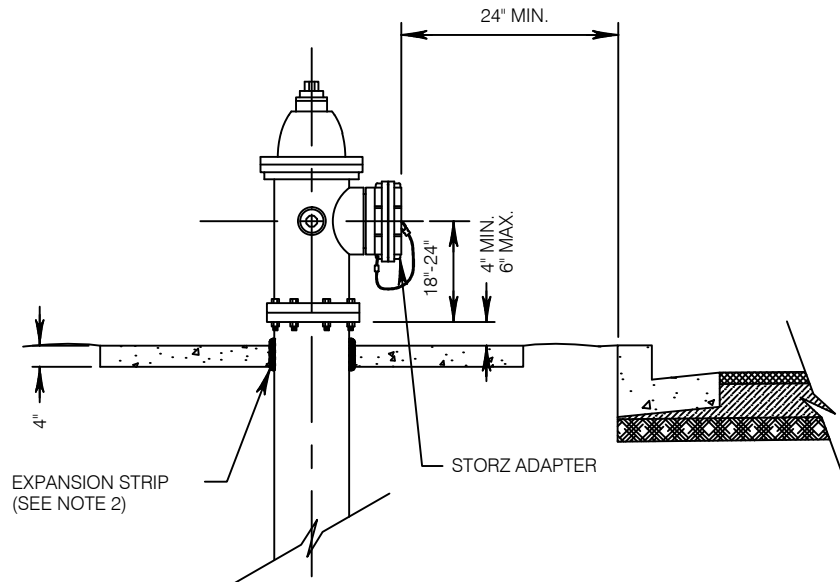
City Engineer

**FIRE HYDRANT
PLACEMENT**

Standard
Detail

521

Revision Date
Feb, 2012




NOTES:

1. CONCRETE SHALL BE CLASS 3000.
2. INSTALL 1/2" WIDE FULL DEPTH EXPANSION STRIP AROUND HYDRANT.
3. FIRE HYDRANT SHALL BE INSTALLED A MIN. OF 24" FROM BACK OF CURB/SIDEWALK TO FACE OF PUMPER.
4. CONCRETE PAD TO BE CONSTRUCTED AT GRADE. NO SOIL CUT AROUND HYDRANT TO MEET MINIMUM HEIGHT STANDARD.



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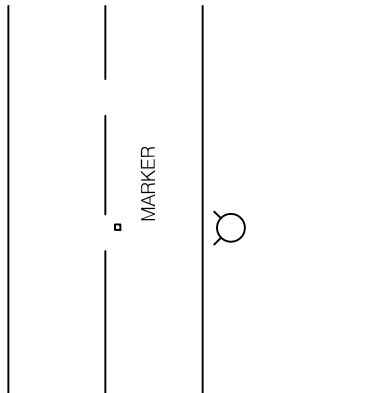
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City Engineer
Date:

**FIRE HYDRANT
PAD DETAILS**

Standard
Detail

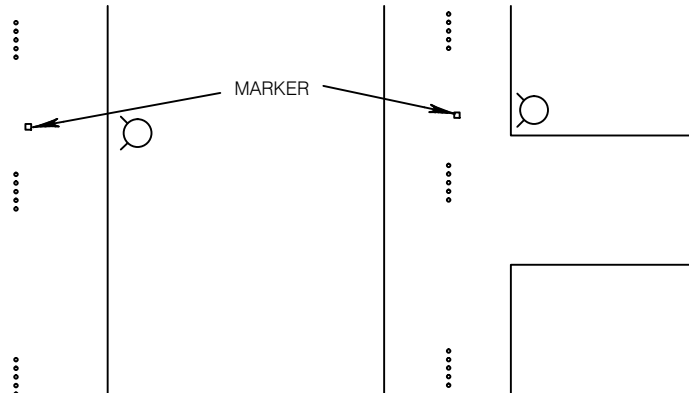
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Revision Date
Feb, 2012



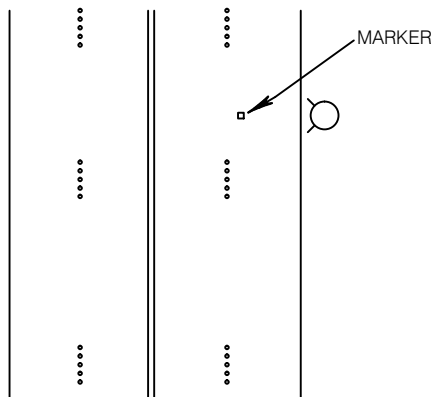
TWO LANE ROAD

OFFSET MARKER TO INDICATE WHICH SIDE OF STREET HYDRANT IS ON. MARKER TO BE PLACED 4" TO 6" OFF OF CENTERLINE



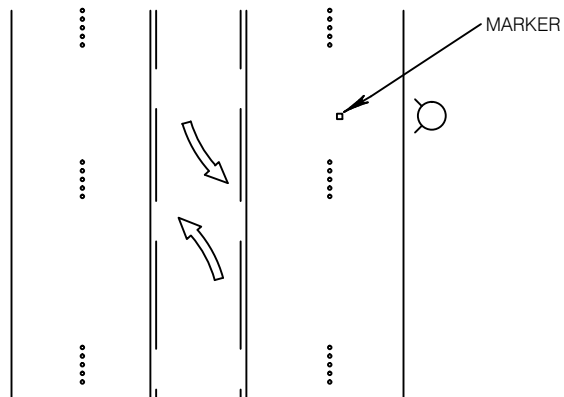
ON SIDE STREETS

WHERE THE HYDRANT IS WITHIN 20' OF THE MAIN TRAVELED STREET, THE MARKER IS TO BE INSTALLED ON THAT MAIN STREET AND 4" TO 6" OFF THE CENTERLINE.



FOUR LANE ROAD

OFFSET MARKER TO INDICATE WHICH SIDE OF STREET HYDRANT IS ON. MARKER TO BE PLACED 4" TO 6" OFF OF DOTS OR PAINTED LANE DIVIDER.



FIVE LANE ROAD

OFFSET MARKER TO INDICATE WHICH SIDE OF STREET HYDRANT IS ON. MARKER TO BE PLACED 4" TO 6" OFF OF DOTS OR PAINTED LANE DIVIDER.

NOTE:

MARKER: Type 88 AB Stimsonite two-way (blue)



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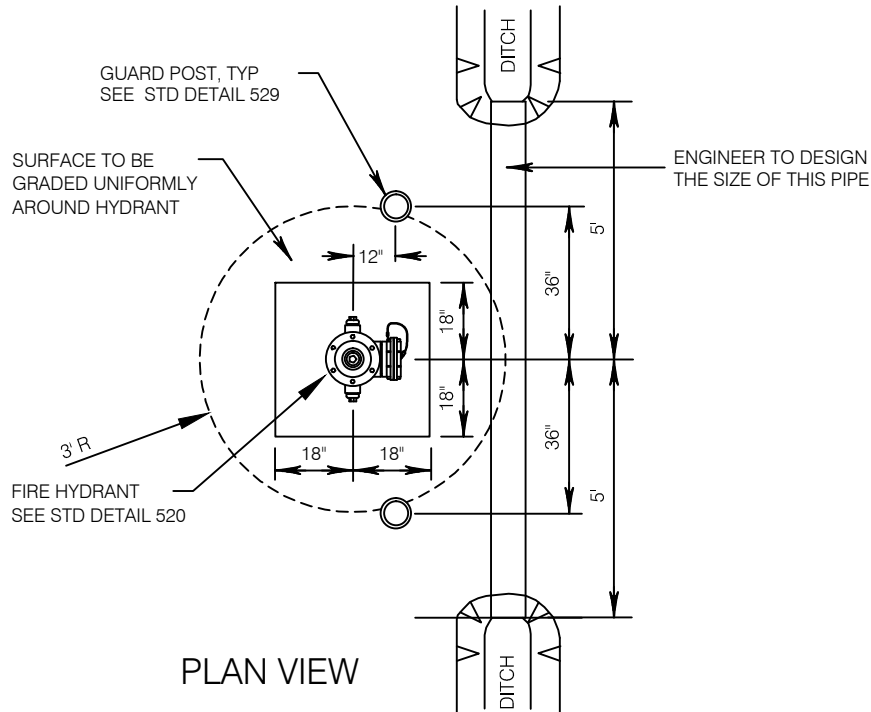
City Engineer

**FIRE HYDRANT
MARKERS**

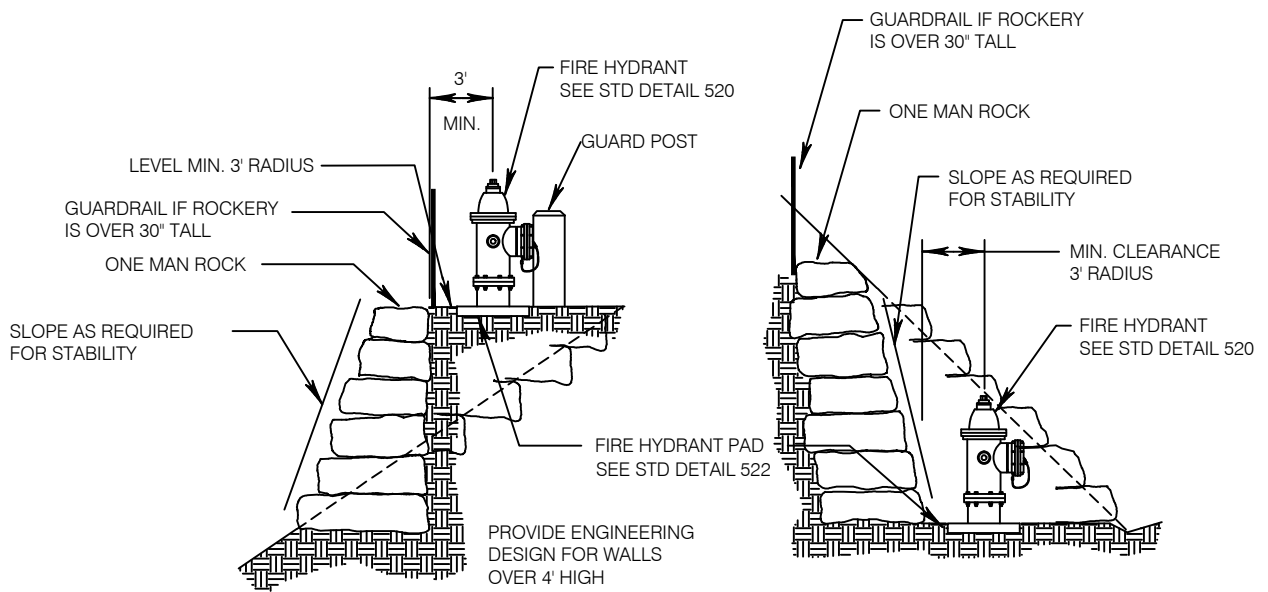
Standard
Detail

523

Revision Date
Feb, 2012



FIRE HYDRANT GUARD POSTS



FIRE HYDRANT IN FILL

FIRE HYDRANT IN CUT



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Approved By:
[Signature]
City Engineer

**FIRE HYDRANT
PLACEMENT/GUARD
POSTS**

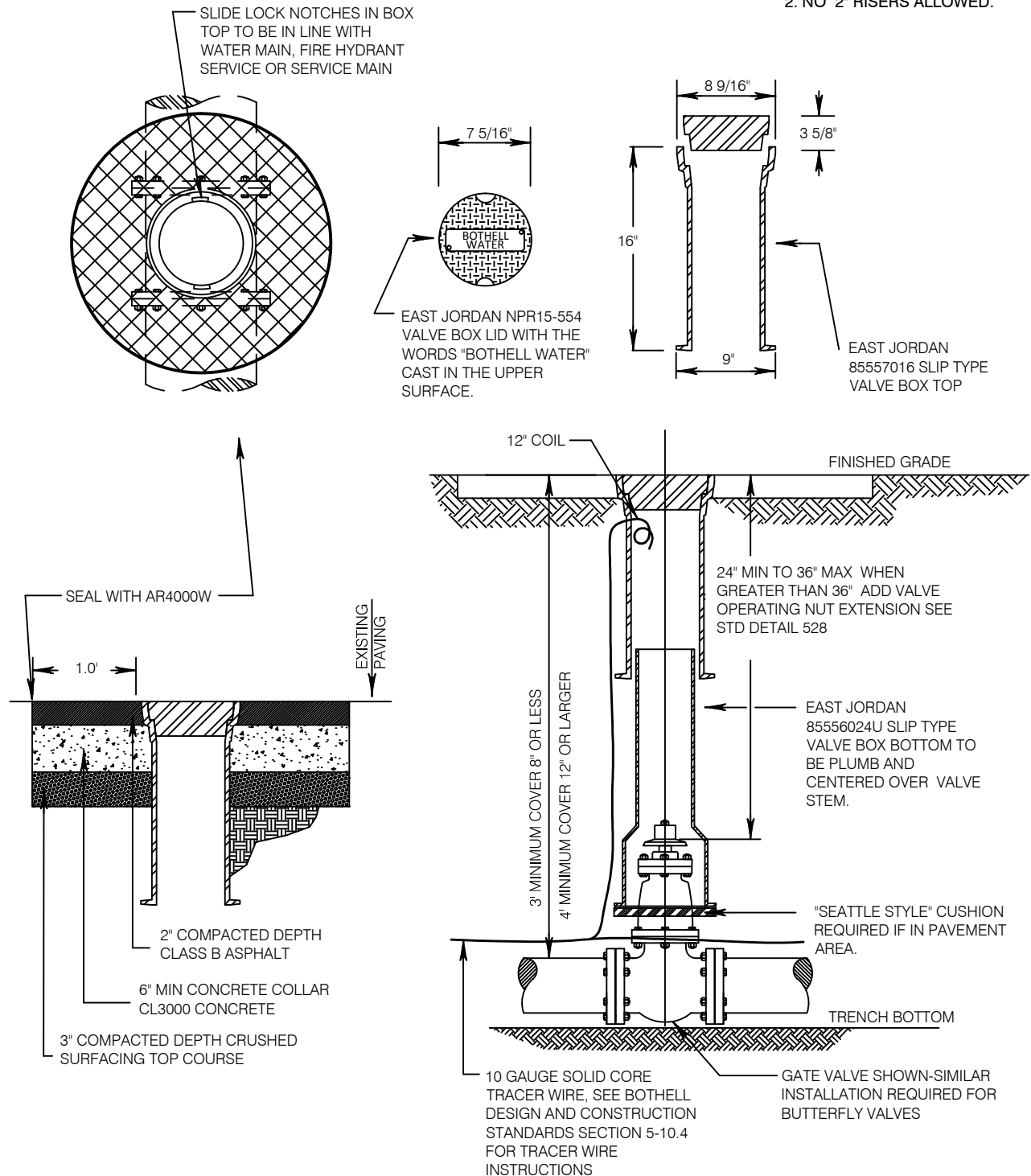
Standard
Detail

524

Revision Date
Feb, 2012

NOTES:

1. IF VALVE IS OUTSIDE OF THE PAVED AREA REFER TO DETAIL 527A.
2. NO 2" RISERS ALLOWED.



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Approved By:

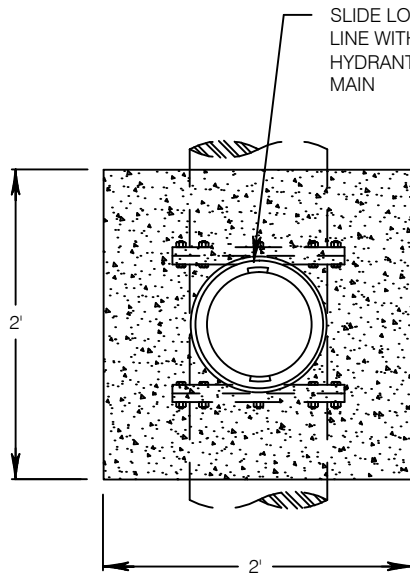
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City Engineer

VALVE BOX
INSIDE PAVED
ROADWAY

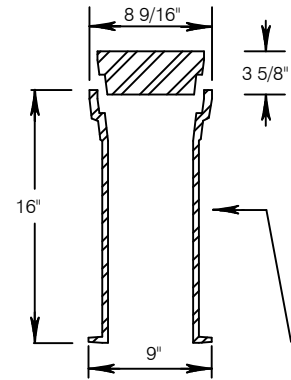
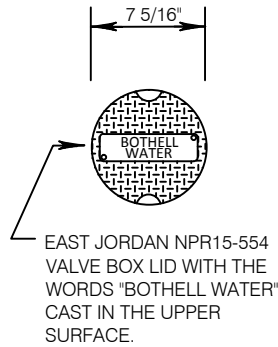
Standard
Detail

527

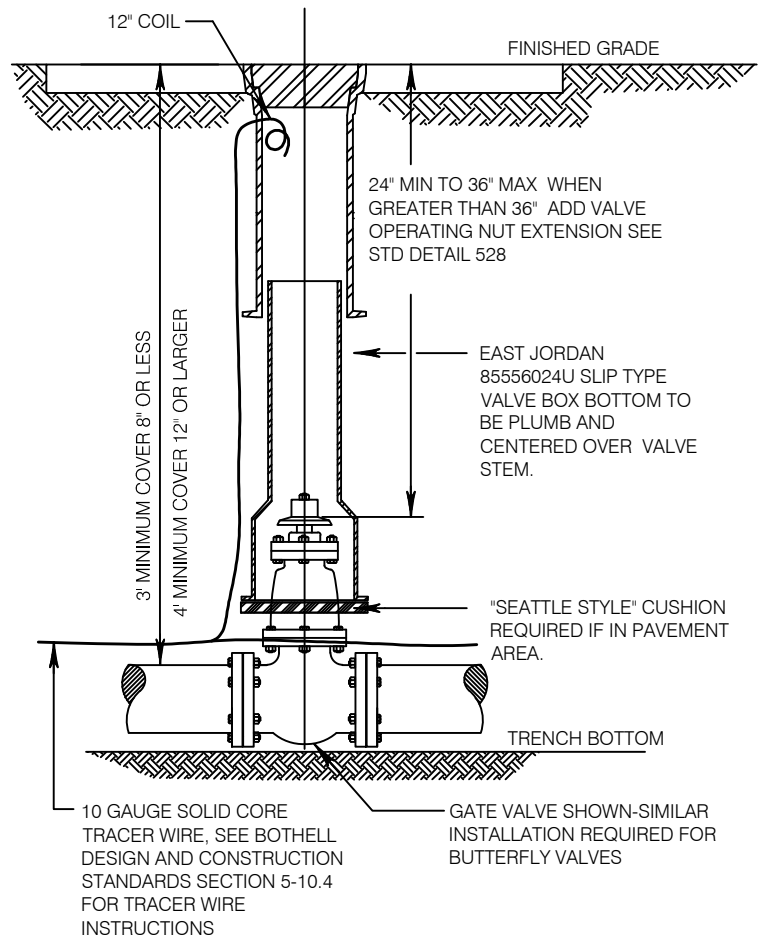
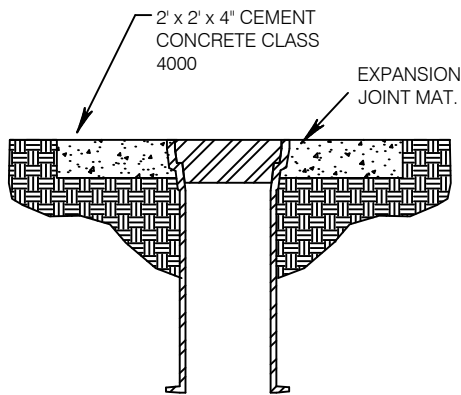
Revision Date
Jun, 2015



SLIDE LOCK NOTCHES TO BE IN LINE WITH WATER MAIN, FIRE HYDRANT SERVICE OR SERVICE MAIN



EAST JORDAN 85557016 SLIP TYPE VALVE BOX TOP



NOTE:

OUTSIDE PAVED AREA REQUIRE VALVE MARKER SEE STD DETAIL 529.



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Approved By:

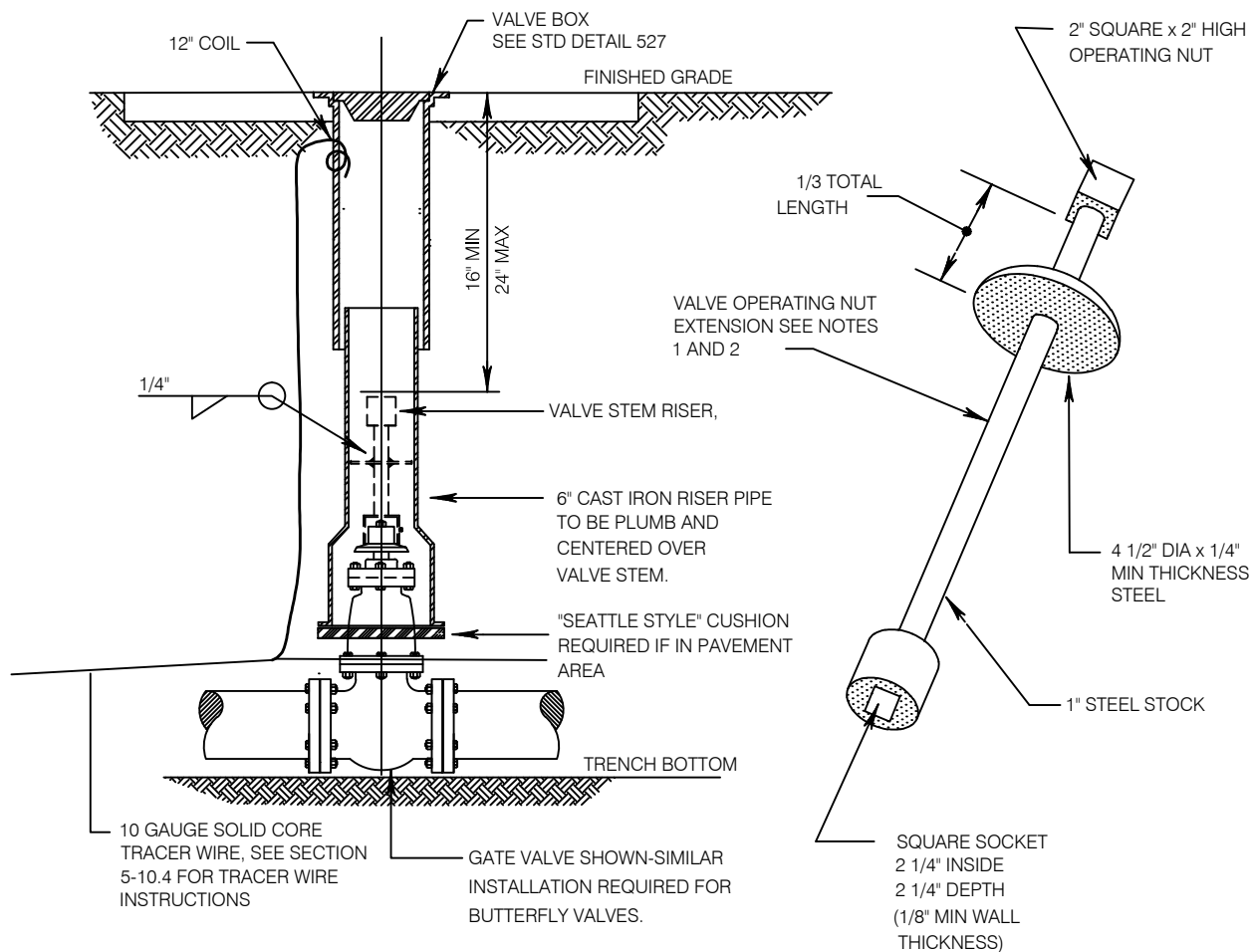
[Signature]
City Engineer

VALVE BOX
OUTSIDE PAVED AREA

Standard
Detail

527A

Revision Date
Jun, 2015



NOTES:

1. VALVE OPERATING NUT EXTENSIONS ARE REQUIRED WHEN THE VALVE NUT IS MORE THAN THREE (3) FEET BELOW FINISHED GRADE. EXTENSIONS ARE TO BE A MINIMUM OF ONE (1) FOOT LONG.
2. ONLY ONE EXTENSION WILL BE ALLOWED PER VALVE.
3. ALL VALVE OPERATING NUT EXTENSIONS ARE TO BE MADE OF STEEL, SIZED AS NOTED, AND PAINTED WITH TWO (2) COATS OF METAL PAINT.



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City Engineer

**VALVE OPERATING
NUT EXTENSION**

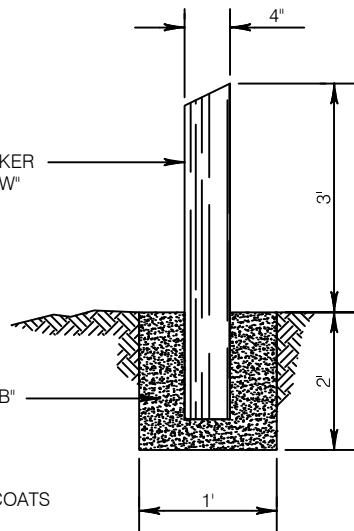
Standard
Detail

528

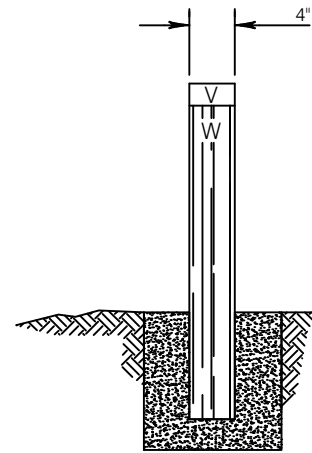
Revision Date
Feb, 2012

REINFORCED CONCRETE MARKER
POST (RCMP) STAMPED WITH "W"

CEMENT CONCRETE CLASS "B"



SIDE

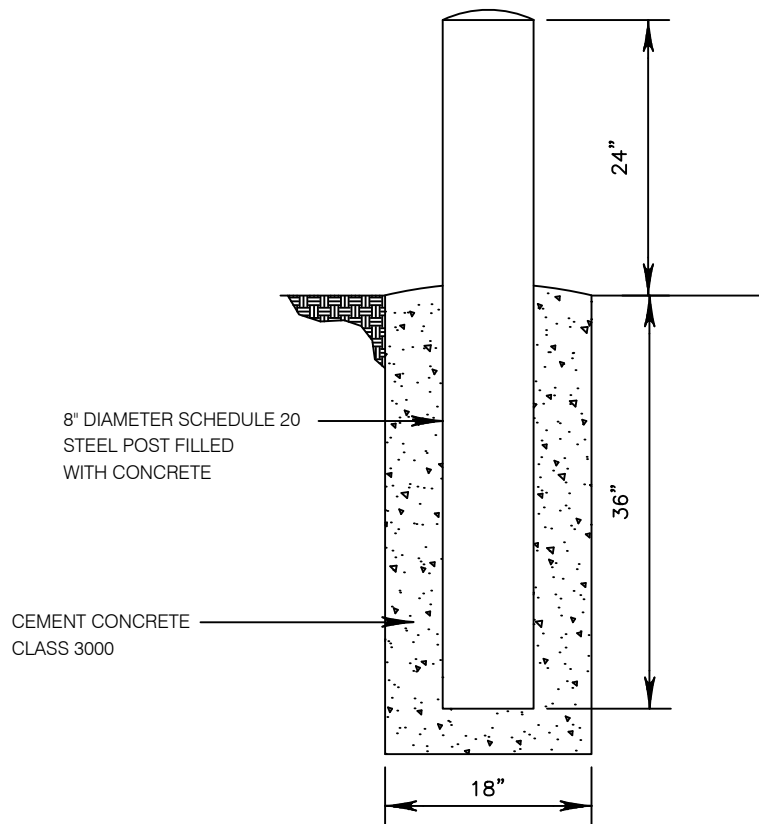


FRONT

VALVE MARKER POST

NOTES:

1. RCMP TO RECEIVE ONE PRIME COAT AND TWO COATS OUTDOOR OIL BASE ENAMEL (WHITE).
2. RCMP IS TO FACE THE VALVE.
3. THE CONTRACTOR IS TO STENCIL ON THE FACE OF THE RCMP IN 3" IN BLACK PAINTED LETTERS THE DISTANCE FROM THE RCMP TO THE VALVE AND TYPE OF VALVE.



8" DIAMETER SCHEDULE 20
STEEL POST FILLED
WITH CONCRETE

CEMENT CONCRETE
CLASS 3000

HYDRANT BOLLARD

NOTES:

1. LOCATE POSTS 3' FROM HYDRANT. DON'T BLOCK HYDRANT PORTS
2. PIPE TO RECEIVE ONE PRIME COAT AND TWO COATS OUTDOOR OIL BASE ENAMEL (SAME COLOR AS HYDRANT-SEE STD DETAIL 520).
3. FOR REMOTE LOCATIONS.



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City Engineer

**VALVE MARKER
AND
GUARD POST**

Standard
Detail

529

Revision Date
Feb, 2012

THRUST BLOCK - TABLE							
PIPE SIZE	PRESSURE PSI	MINIMUM BEARING AREA AGAINST UNDISTURBED SOIL SQUARE FEET					
		A	B	C	D	E	X (100 PSI)
4"	200	2/(1)	1/(NONE)	1/(NONE)	NONE	NONE	NONE
	300	3/(2)	2/(2)	2/(1)	1/(1)	NONE	NONE
6"	200	4/(3)	3/(2)	3/(1)	1/(1)	1/(NONE)	NONE
	300	6/(4)	4/(3)	3/(2)	2/(1)	1/(NONE)	NONE
8"	200	7/(5)	5/(3)	4/(3)	2/(2)	1/(1)	3/(2)
	300	11/(8)	8/(5)	6/(4)	3/(2)	2/(1)	3/(2)
10"	200	11/(8)	8/(6)	6/(4)	3/(2)	2/(1)	4/(3)
	275	16/(11)	11/(7)	9/(6)	5/(3)	3/(2)	4/(3)
12"	200	16/(11)	11/(8)	9/(6)	5/(3)	3/(2)	5/(4)
	250	24/(16)	17/(11)	13/(9)	7/(5)	4/(3)	5/(4)
14"	200	22/(13)	16/(11)	12/(8)	6/(4)	3/(2)	7/(6)
	250	33/(22)	23/(16)	18/(12)	9/(6)	5/(3)	7/(6)
16"	200	29/(19)	21/(14)	16/(11)	8/(6)	5/(3)	10/(7)
	225	23/(16)	23/(16)	17/(12)	9/(6)	5/(3)	10/(7)
18"	200	36/(24)	26/(17)	20/(13)	10/(7)	5/(4)	13/(9)
20"	200	45/(29)	32/(21)	24/(16)	13/(8)	7/(4)	16/(11)
24"	200	64/(43)	46/(30)	35/(23)	18/(12)	9/(6)	23/(16)

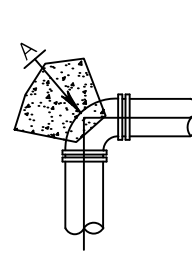
NOTES:

1. SQUARE FEET OF CONCRETE THRUSTS - BLOCK AREA BASED ON SAFE BEARING LOAD OF 2000/(3000) POUNDS PER SQUARE FOOT.
2. AREAS MUST BE ADJUSTED FOR OTHER SIZE PIPE, PRESSURES & SOIL CONDITIONS.
3. CONCRETE BLOCKING SHALL BE CAST IN PLACE AND HAVE MINIMUM OF 1/4 SQ. FT. BEARING AGAINST THE FITTING.
4. BLOCK SHALL BEAR AGAINST FITTINGS ONLY AND SHALL BE CLEAR OF JOINTS TO PERMIT TAKING UP OR DISMANTLING JOINT.
5. CONTRACTOR SHALL INSTALL BLOCKING ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS TO CONTINUOUSLY WITHSTAND OPERATING PRESSURE UNDER ALL CONDITIONS OF SERVICE.
6. 8 MIL PLASTIC OR CONSTRUCTION FABRIC WILL BE WRAPPED AROUND PIPE AND FITTINGS BEFORE THRUST BLOCKS ARE POURED.

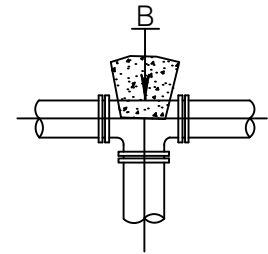
SAFE BEARING LOADS IN LB./SQ. FT.
THE SAFE BEARING LOADS GIVEN IN THE TABLE BELOW ARE FOR HORIZONTAL THRUSTS WHEN THE DEPTH OF COVER OVER THE PIPE EXCEEDS 2'.

SOIL	SAFE BEARING LOAD LB. PER SQ. FT.
* MUCK, PEAT, ETC.	0
SOFT CLAY	1,000
SAND	2,000
SAND & GRAVEL	3,000
SAND, GRAVEL AND CEMENTED WITH CLAY	4,000
HARD SHALE	10,000

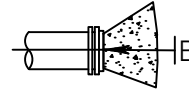
* IN MUCK OR PEAT, ALL THRUSTS SHALL BE RESTRAINED BY PILES OR TIE RODS TO SOLID FOUNDATIONS OR BY REMOVAL OF MUCK OR PEAT AND REPLACEMENT WITH BALLAST OF SUFFICIENT STABILITY TO RESIST THRUST.



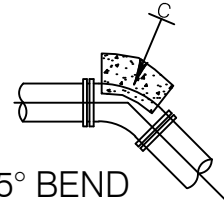
90° BEND



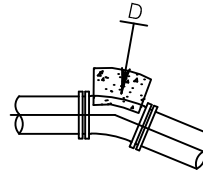
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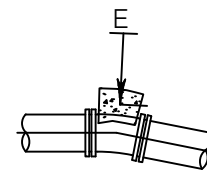
CAP



45° BEND

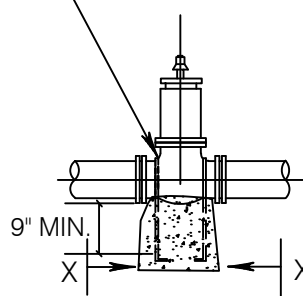


22 1/2° BEND



11 1/4° BEND

2 - 3/4" DIA. RODS FOR 10" SIZE & SMALLER
2 - 1" DIA. RODS LARGER THAN 10" SIZE



GATE VALVE

NOTE: ADDITIONAL BLOCKING MUST BE PROVIDED IF GATE VALVE IS AT END OF LINE DURING TESTING.



City of Bothell

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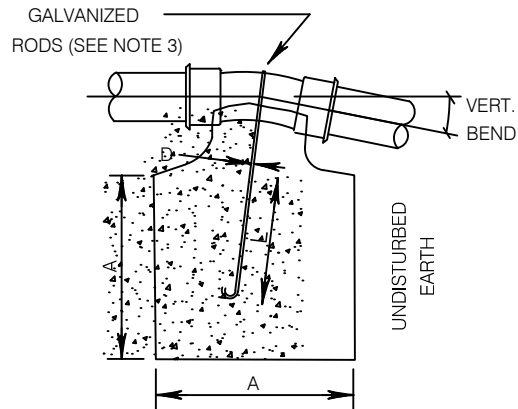
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City Engineer

**WATER MAIN
THRUST BLOCKING**

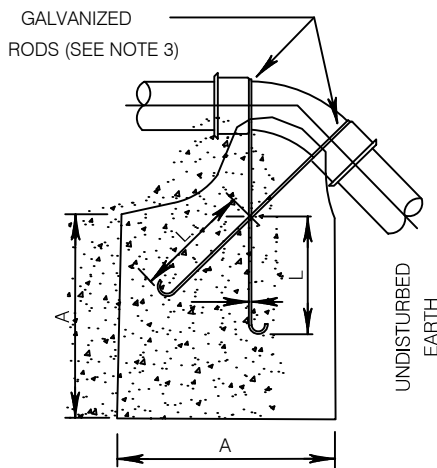
Standard
Detail

530

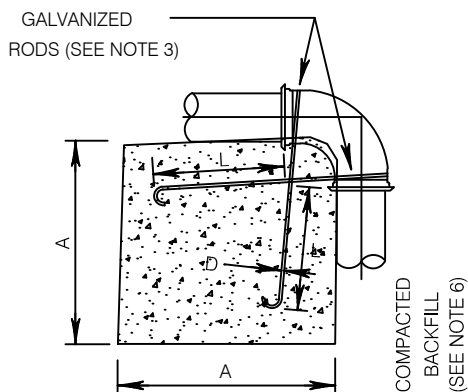
Revision Date
Feb, 2012



VERTICAL BLOCKING
11 1/4°, 22 1/2° BENDS



VERTICAL BLOCKING
FOR 45° BENDS



VERTICAL BLOCKING
FOR 90° BENDS

VERTICAL BLOCKING SIZE W/RESTRAINED JOINTS SOIL TYPE = COHESIVE GRANULAR (GC+SC) SAND, GRAVEL, CLAY MIXTURE					
PIPE SIZE	V B	CU FT	A	D	L
4"	11 1/4°	*			
	22 1/2°	*			
	45°	*			
	90°	16	2.5'	3/4"	2.0'
6"	11 1/4°	*			
	22 1/2°	*			
	45°	13	2.3'	3/4"	2.0'
	90°	43	3.5'	3/4"	2.0'
8"	11 1/4°	*			
	22 1/2°	*			
	45°	33	3.2'	3/4"	2.0'
	90°	86	4.4'	3/4"	2.0'
10"	11 1/4°	*			
	22 1/2°	13	2.3'	3/4"	2.0'
	45°	64	4.0'	3/4"	2.0'
	90°	141	5.2'	1"	3.5'
12"	11 1/4°	*			
	22 1/2°	20	2.7'	3/4"	2.0'
	45°	111	4.8'	3/4"	2.0'
	90°	206	5.9'	1 1/8"	4.0'

* BLOCKING NOT REQUIRED IF 36" OF PIPE IS RESTRAINED ON EACH SIDE OF BEND.

NOTES:

- CONCRETE BLOCKING SIZES BASED ON:
 - 36" OF PIPE RESTRAINED EACH SIDE OF BEND.
 - THRUST BLOCK AREAS BASED ON SAFE BEARING LOAD. OF 1,000 PSF.
 - 2,500 PSI CONCRETE.
 - MINIMUM 3' OF COVER.
 - PIPE THRUST BASED ON 200 PSI PRESSURE.
 - PIPE ENCASED IN 8 MIL POLYETHYLENE.
 - VERTICAL BLOCK SIZE BASED ON CONCRETE WEIGHT OF 150 PCF.
 - TRENCH CONDITIONS BASED ON TYPE 2, FLAT BOTTOM TRENCH WITH LIGHTLY CONSOLIDATED BACKFILL, PER ANSI/AWWA C150/A21.50.
 - FACTOR OF SAFETY IS 1.5.
 - SOIL FRICTIONAL RESISTANCE BASED ON COHESIVE GRANULAR SOIL TYPE (GC+SC). SAND, GRAVEL, CLAY MIXTURE.
- BLOCKING DESIGN MUST BE ADJUSTED FOR OTHER SIZE PIPE, PRESSURES AND SOIL CONDITIONS.
- DEFORMED REINFORCEMENT BARS SHALL BE IN ACCORDANCE WITH ASTM A 615. BARS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A 767.
- LINE SHALL NOT BE PRESSURIZED UNTIL ALL TRENCHING WITHIN 100 FEET OF VERTICAL BEND IS BACKFILLED AND COMPACTED TO MINIMUM COVER OF 3 FEET OVER PIPE.
- 90° VERTICAL BENDS SHALL ONLY BE INSTALLED WHERE GIVEN PRIOR APPROVAL BY THE UTILITY.
- BACKFILL TRENCH BEYOND 90° VERTICAL BLOCK WITH CRUSHED SURFACING TOP COURSE MATERIAL COMPACTED TO 95% MAXIMUM DENSITY. CRUSHED BACKFILL SHALL EXTEND 20' BEYOND BLOCK OR TO FIRM BEARING TRENCH WALL, WHICHEVER IS LESS.



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City Engineer

**WATER MAIN
VERTICAL
THRUST BLOCKING**

Standard
Detail

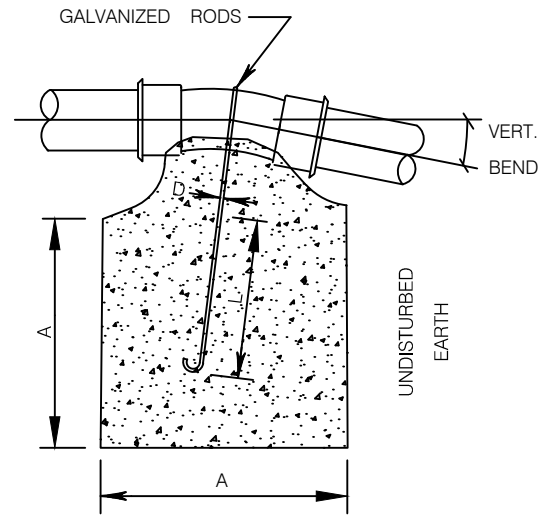
531

Revision Date
Feb, 2012

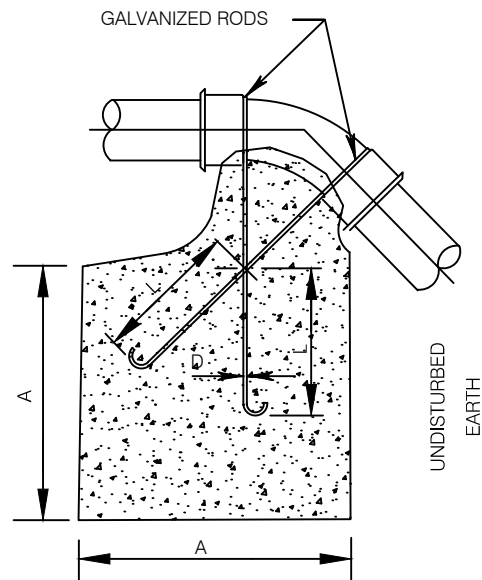
VERTICAL BLOCKING FOR 11 1/4° - 22 1/2° BENDS					
PIPE SIZE	V B	CU FT	A	D	L
4"	11 1/4°	8	2.0'	3/4"	1' 6"
	22 1/2°	11	2.2'		2.0'
6"	11 1/4°	11	2.2'	3/4"	2.0'
	22 1/2°	25	2.9'		
8"	11 1/4°	16	2.5'	3/4"	2.0'
	22 1/2°	47	3.6'		
12"	11 1/4°	32	3.2'	3/4"	2.0'
	22 1/2°	88	4.5'	7/8"	3.0'
16"	11 1/4°	70	4.1'	7/8"	3.0'
	22 1/2°	184	5.7'	1 1/8"	4.0'
20"	11 1/4°	91	4.5'	7/8"	3.0'
	22 1/2°	225	6.1'	1 1/4"	4.0'
24"	11 1/4°	128	5.0'	1"	3' 6"
	22 1/2°	320	6.8'	1 3/8"	4' 6"
VERTICAL BLOCKING FOR 45° BENDS					
4"	45°	30	3.1'	3/4"	2.0'
6"		68	4.1'		
8"		123	5.0'		
12"		232	6.1'	3/4"	2' 6"
16"		478	7.8'	1 1/8"	4.0'
20"		560	8.2'	1 1/4"	
24"		820	9.4'	1 3/8"	4' 6"

NOTE:

CONCRETE BLOCKING BASED ON 200 PSI
PRESSURE AND 2500 PSI CONCRETE.



**VERTICAL BLOCKING FOR
11 1/4°, 22 1/2° BENDS**



**VERTICAL BLOCKING FOR
45° BENDS**



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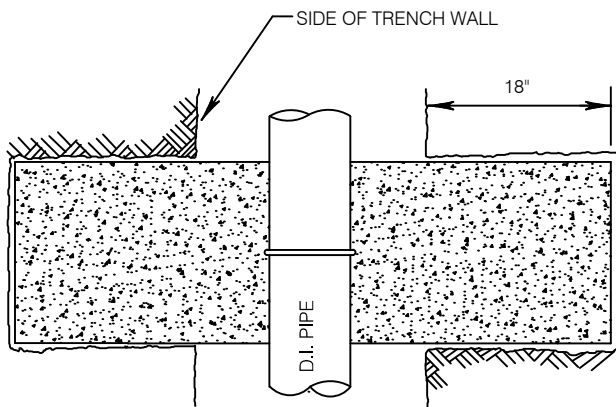
Approved By:
[Signature]
City Engineer

**EXISTING WATER MAIN
VERTICAL
THRUST BLOCKING**

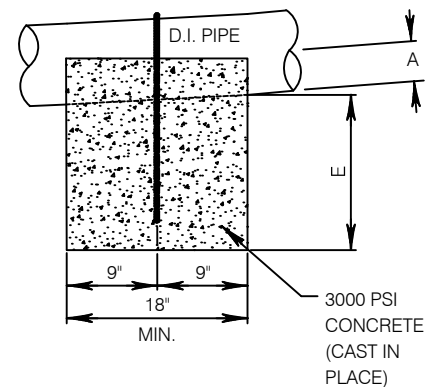
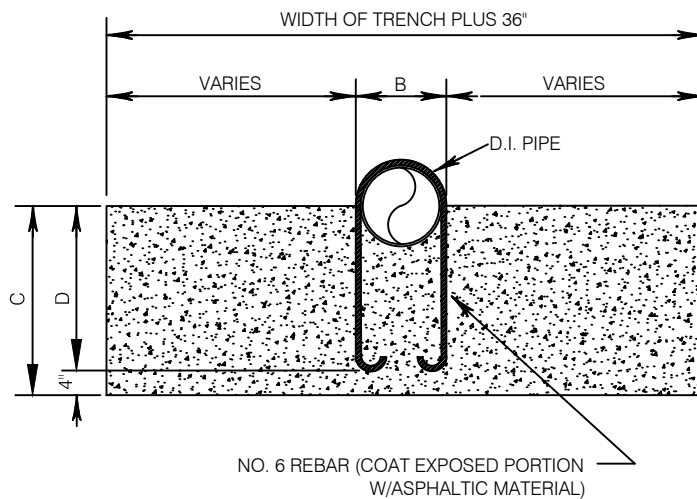
Standard
Detail

532

Revision Date
Feb, 2012



PIPE SIZE	DIMENSIONS (INCHES)				
	A	B	C	D	E
4"	2 $\frac{3}{8}$ "	4 $\frac{3}{4}$ "	17	13	14 $\frac{1}{2}$ "
6"	3 $\frac{1}{2}$ "	6 $\frac{7}{8}$ "	18	14	14 $\frac{1}{2}$ "
8"	4 $\frac{1}{2}$ "	9 $\frac{1}{8}$ "	19	15	14 $\frac{1}{2}$ "
10"	5 $\frac{5}{8}$ "	11 $\frac{1}{8}$ "	20	16	14 $\frac{3}{8}$ "
12"	6 $\frac{5}{8}$ "	13 $\frac{1}{4}$ "	21	17	14 $\frac{3}{8}$ "
14"	7 $\frac{3}{4}$ "	15 $\frac{1}{4}$ "	22	18	14 $\frac{1}{4}$ "
16"	8 $\frac{3}{4}$ "	17 $\frac{1}{4}$ "	23	19	14 $\frac{1}{4}$ "
18"	9 $\frac{3}{4}$ "	19 $\frac{1}{4}$ "	24	20	14 $\frac{1}{4}$ "



SLOPES > 20% - PROVIDE CONCRETE SLOPE
ANCHORS (20' TO 25' ON CENTER.)



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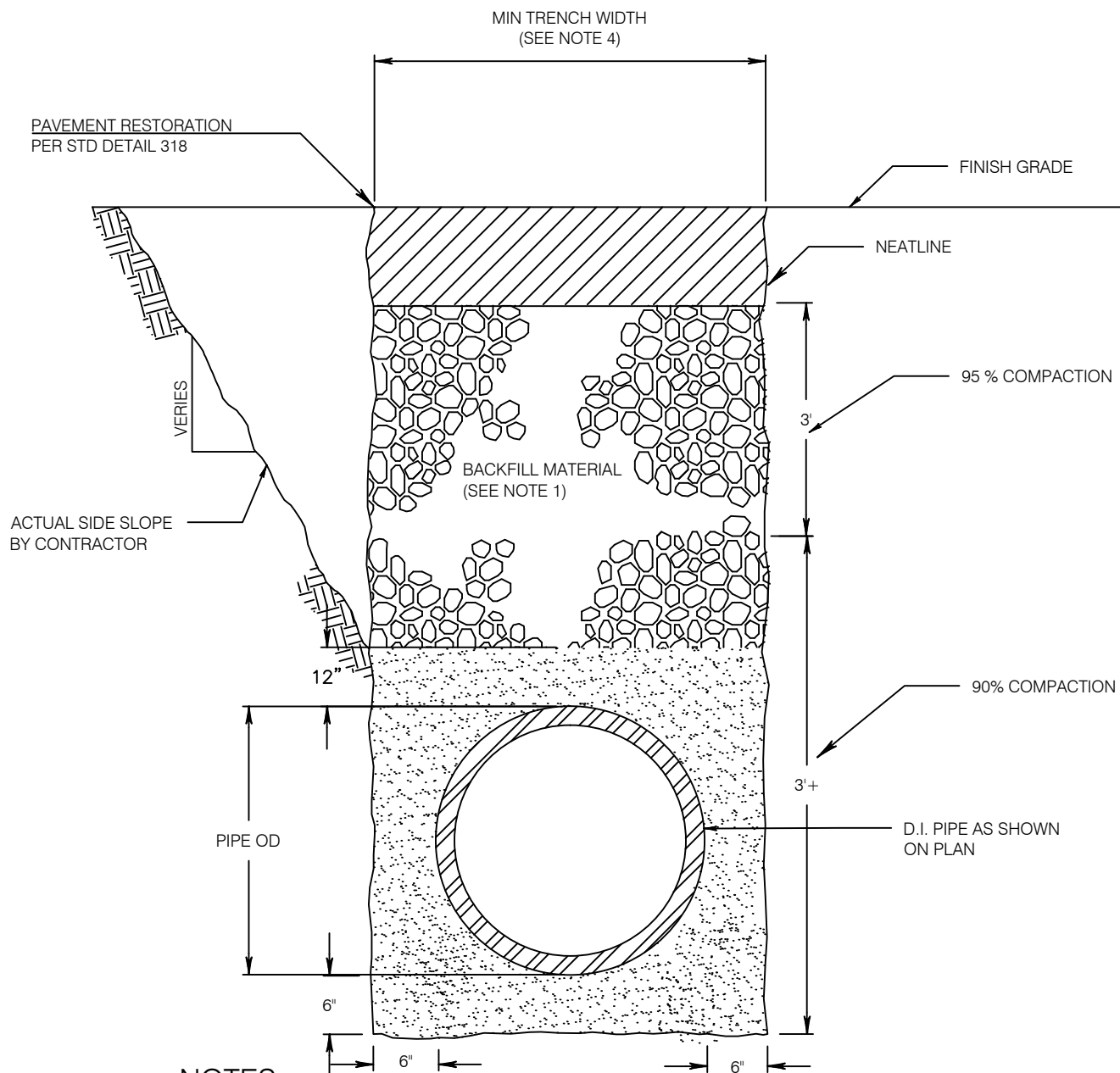
City Engineer

**WATER MAIN
SLOPE ANCHORS**

Standard
Detail

533

Revision Date
Feb, 2012



NOTES:

1. ALL TRENCH BACKFILL MATERIAL SHALL CONSIST OF SUITABLE NATIVE EXCAVATED MATERIAL OR IMPORTED BACKFILL MATERIAL AS AUTHORIZED BY THE CITY ENGINEER. ALL TRENCH MATERIAL SHALL BE COMPACTED TO 95% MDD.
2. FOUNDATION GRAVEL SHALL BE REQUIRED TO PROVIDE A SOLID FOUNDATION FOR THE WATER MAIN IN THOSE AREAS OF THE TRENCH WHICH HAVE UNSUITABLE MATERIAL OR SOFT SPOTS.
3. PLACE AND COMPACT BACKFILL IN A MINIMUM 4" LIFT TO PIPE SPRINGLINE TO ASSURE NO VOIDS UNDER PIPE.
4. MINIMUM TRENCH WIDTH FOR THE PIPE DIAM. 15" AND UNDER IS I.D. + 30", FOR PIPE DIAM. 16" AND OVER IS (1.5 X I.D.) + 18".



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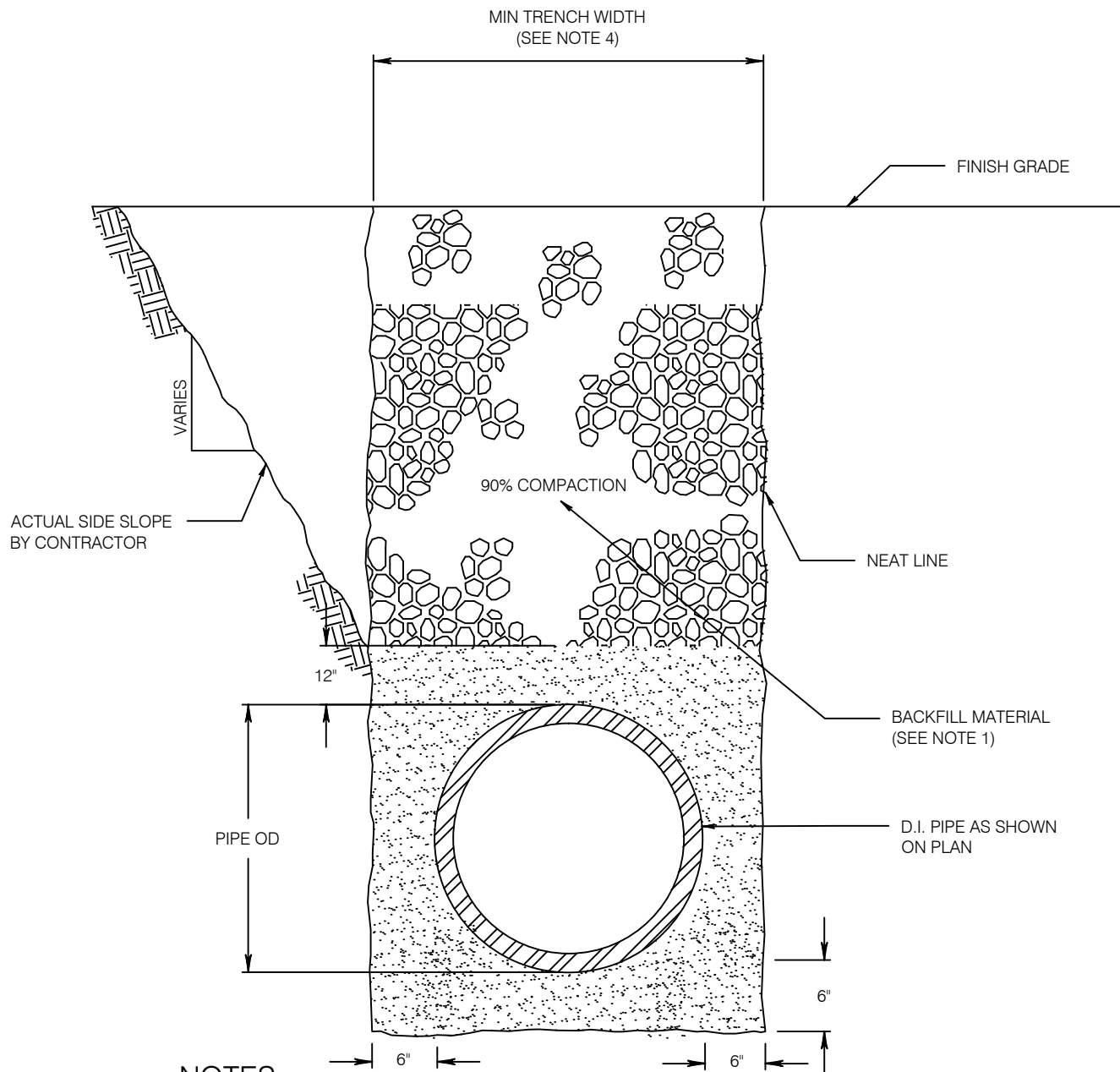
[Signature]
City Engineer

**WATER MAIN TRENCH
IN PAVED AREAS
AND WITHIN
THE RIGHT-OF-WAY**

Standard
Detail

534

Revision Date
Feb, 2012



NOTES:

1. ALL TRENCH BACKFILL MATERIAL SHALL CONSIST OF SUITABLE NATIVE EXCAVATED MATERIAL OR IMPORTED BACKFILL MATERIAL AS AUTHORIZED BY THE CITY ENGINEER. ALL TRENCH MATERIAL SHALL BE COMPACTED TO 90% MDD.
2. FOUNDATION GRAVEL SHALL BE REQUIRED TO PROVIDE A SOLID FOUNDATION FOR THE WATER MAIN IN THOSE AREAS OF THE TRENCH WHICH HAVE UNSUITABLE MATERIAL OR SOFT SPOTS.
3. PLACE AND COMPACT BACKFILL IN A MINIMUM 4" LIFT TO PIPE SPRINGLINE TO ASSURE NO VOIDS UNDER PIPE.
4. MINIMUM TRENCH WIDTH FOR THE PIPE DIAM. 15" AND UNDER IS I.D. + 30", FOR PIPE DIAM. 16" AND OVER IS (1.5 X I.D.) + 18".



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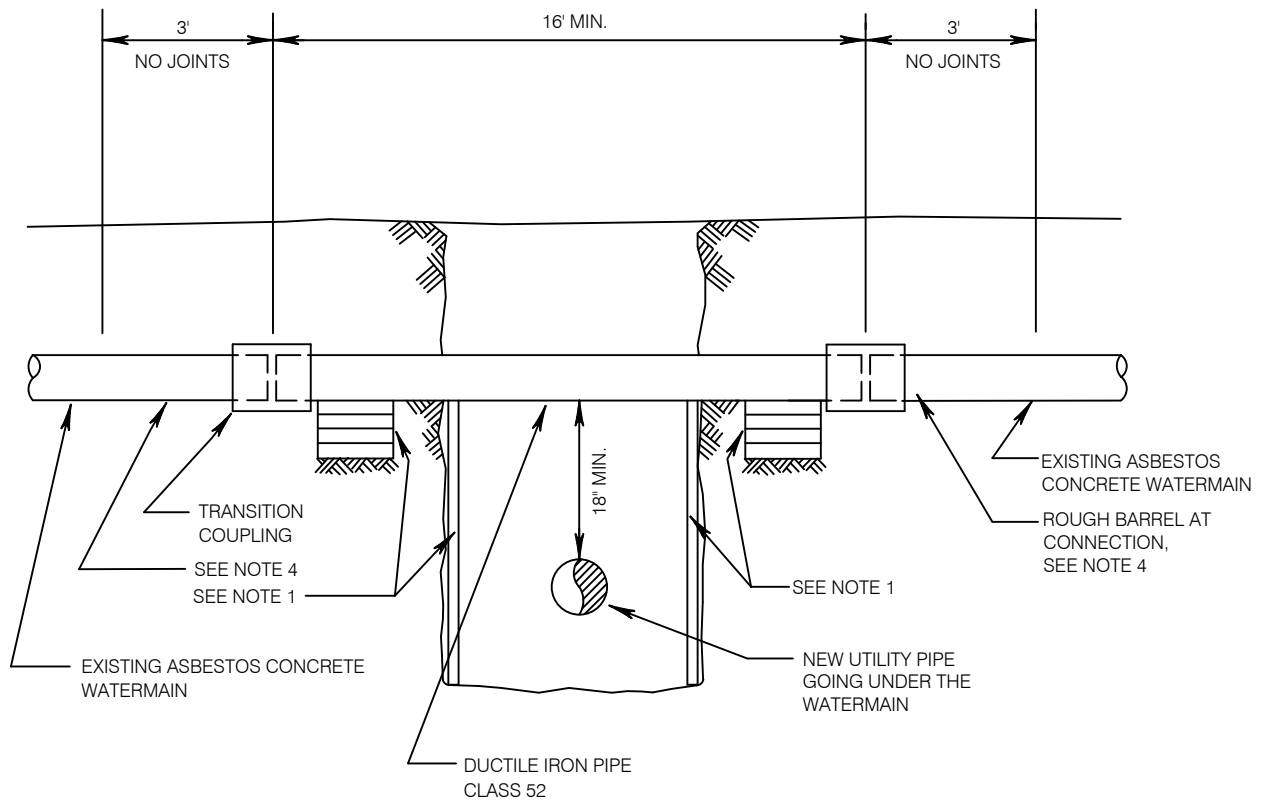
[Signature]
City Engineer

**WATER MAIN TRENCH
IN UNPAVED
AREAS AND OUTSIDE
THE RIGHT-OF-WAY**

Standard
Detail

535

Revision Date
Feb, 2012



NOTES:

1. DUCTILE IRON PIPE SHALL REST ON FIRM BEARING EARTH: SHORE TRENCH WALL UNDER WATER MAIN AS SHOWN, OR SUPPORT PIPE WITH PATIO BLOCKS (8"x16"x2"). STACK BLOCKS AS REQUIRED TO REST ON FIRM BEARING SOIL.
2. WRAP DUCTILE IRON PIPE AND TRANSITION COUPLINGS WITH 8 MIL POLYETHYLENE CONFORMING TO AWWA C-105.
3. THE CONTRACTOR SHALL PROVIDE PROTECTIVE CLOTHING AND EQUIPMENT (COVERALLS, GLOVES, BOOTS, HEAD COVERING, GOGGLES, RESPIRATOR) TO CREWS WORKING WITH ASBESTOS CEMENT PIPE IN ORDER TO ASSURE THE WORKERS' EXPOSURE TO ASBESTOS MATERIAL BE AT OR BELOW THE LIMIT PRESCRIBED IN WAC 296-62-07705.
4. ASBESTOS CEMENT PIPE SHALL BE CUT WITH A REED WHEEL CUTTER WITH CONTROLLED FLOWING WATER. CONNECTIONS SHALL BE MADE ON ROUGH BARRELS OF PIPE CONNECTIONS. NO CONNECTIONS SHALL BE MADE WITHIN 3' OF EXISTING ASBESTOS CONCRETE COUPLING JOINTS.
5. CONTAMINATED CLOTHING SHALL BE TRANSPORTED IN SEALED IMPERMEABLE BAGS AND LABELED IN ACCORDANCE WITH WAC 296-62-07721. ASBESTOS CEMENT PIPE SHALL BE LEFT AND BURIED IN TRENCH.
6. WHERE NEW UTILITY PIPE CROSSES UNDER ASBESTOS CONCRETE PIPE, A SECTION OR SECTIONS OF ASBESTOS CONCRETE PIPE MUST BE REPLACED WITH DUCTILE IRON PIPE, CEMENT LINED, CLASS 52. DUCTILE IRON PIPE TO BE PLACED WITH PE. x PE. WITH TRANSITION COUPLINGS ON EACH END.



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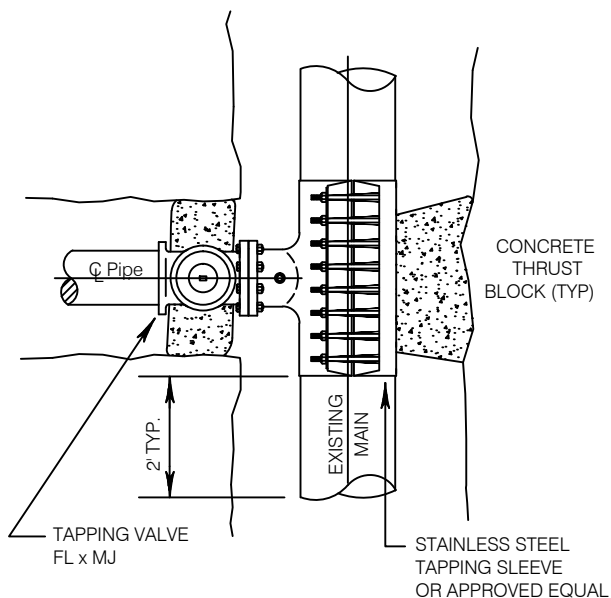
**UNDERCROSSING
EXISTING ASBESTOS
CONCRETE MAINS**

Standard
Detail

540

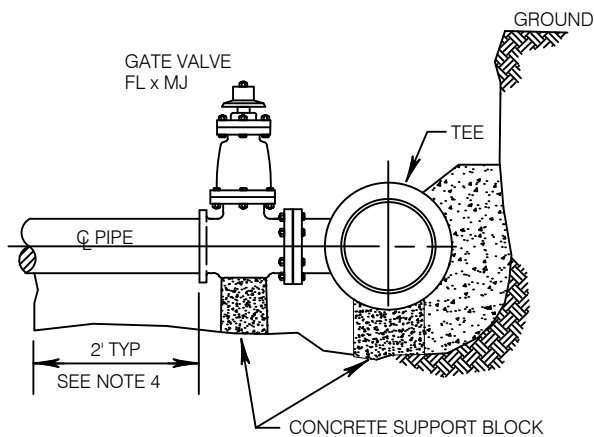
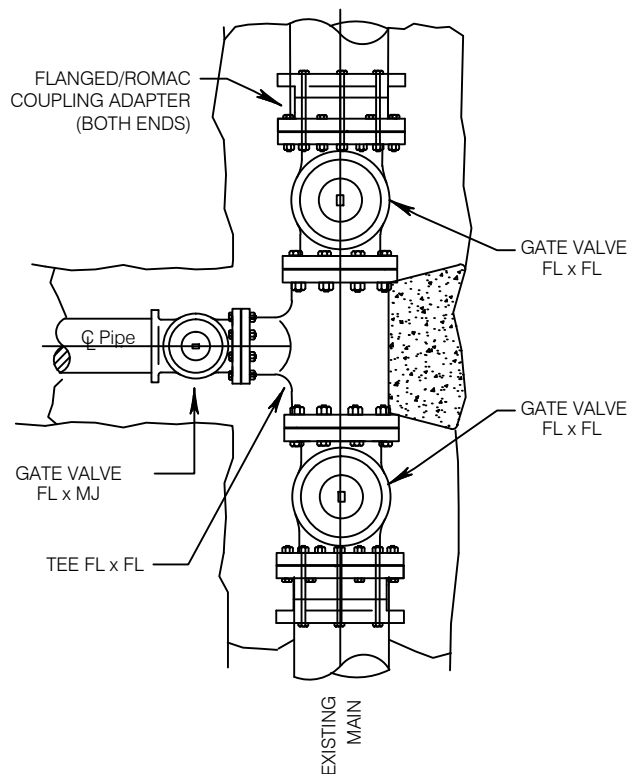
Revision Date
Feb, 2012

LIVE TAP



VALVE AND SLEEVE SHALL BE SUPPORTED AND BACKFILLED AS SHOWN BELOW-RIGHT.

CUT-IN-TEE



NOTES:

1. 8 MIL PLASTIC OR CONSTRUCTION FABRIC SHALL BE WRAPPED AROUND PIPE AND FITTINGS BEFORE THRUST BLOCKS ARE POURED.
2. SUPPORT VALVE AND SLEEVE CONTINUOUSLY THROUGH INSTALLATION.
3. STAINLESS STEEL TAPPING TEES SHALL HAVE A FULL CIRCLE SEAL.
4. NO CONNECTIONS WITHIN THIS AREA.



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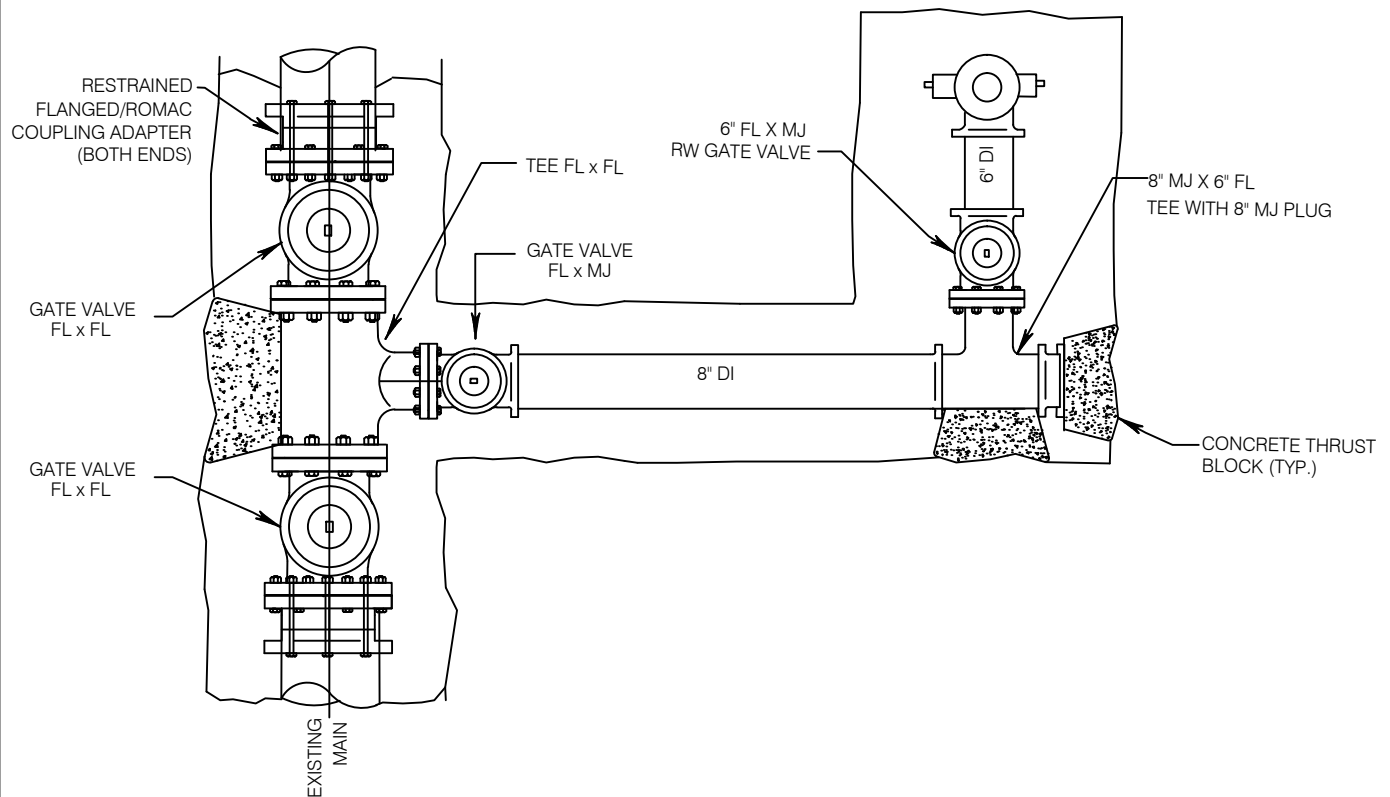
City Engineer

**CONNECTION TO
EXISTING MAIN**

Standard
Detail

545

Revision Date
Nov, 2013



NOTES:

1. 8 MIL PLASTIC OR CONSTRUCTION FABRIC SHALL BE WRAPPED AROUND PIPE AND FITTINGS BEFORE THRUST BLOCKS ARE POURED.
2. SUPPORT VALVE AND SLEEVE CONTINUOUSLY THROUGH INSTALLATION.
3. ALL PIPING TO BE RESTRAINED.
4. REFER TO DETAILS 520,521,522,523,524



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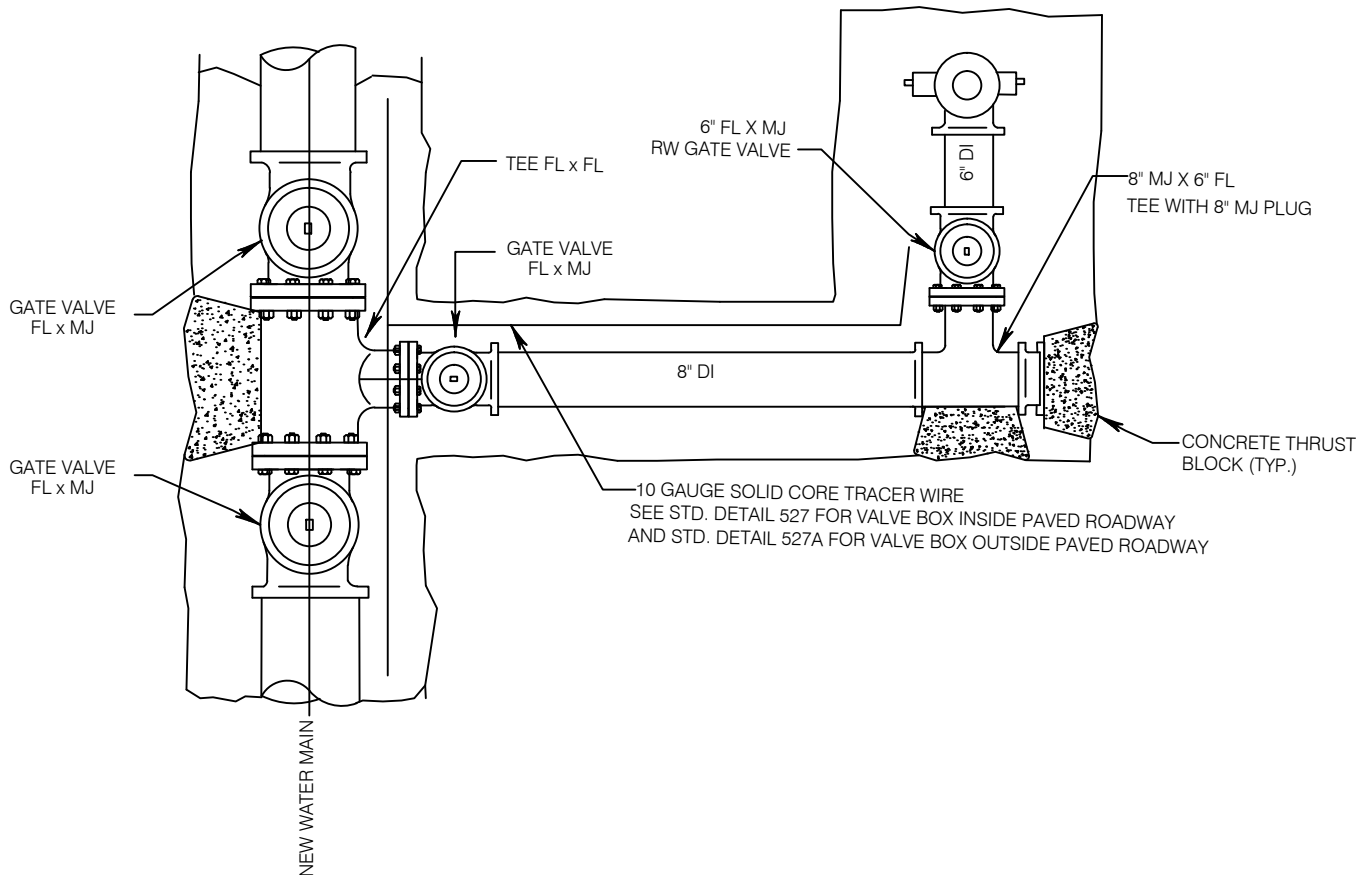
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City Engineer

HYDRANT RUN OVER
50' LENGTH
EX. MAIN

Standard
Detail

546

Revision Date
Nov, 2013



NOTES:

1. 8 MIL PLASTIC OR CONSTRUCTION FABRIC SHALL BE WRAPPED AROUND PIPE AND FITTINGS BEFORE THRUST BLOCKS ARE POURED.
2. SUPPORT VALVE CONTINUOUSLY THROUGH INSTALLATION.
3. ALL PIPING TO BE RESTRAINED
4. REFER TO DETAILS 520,521,522,523,524



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PUBLIC WORKS DEPARTMENT

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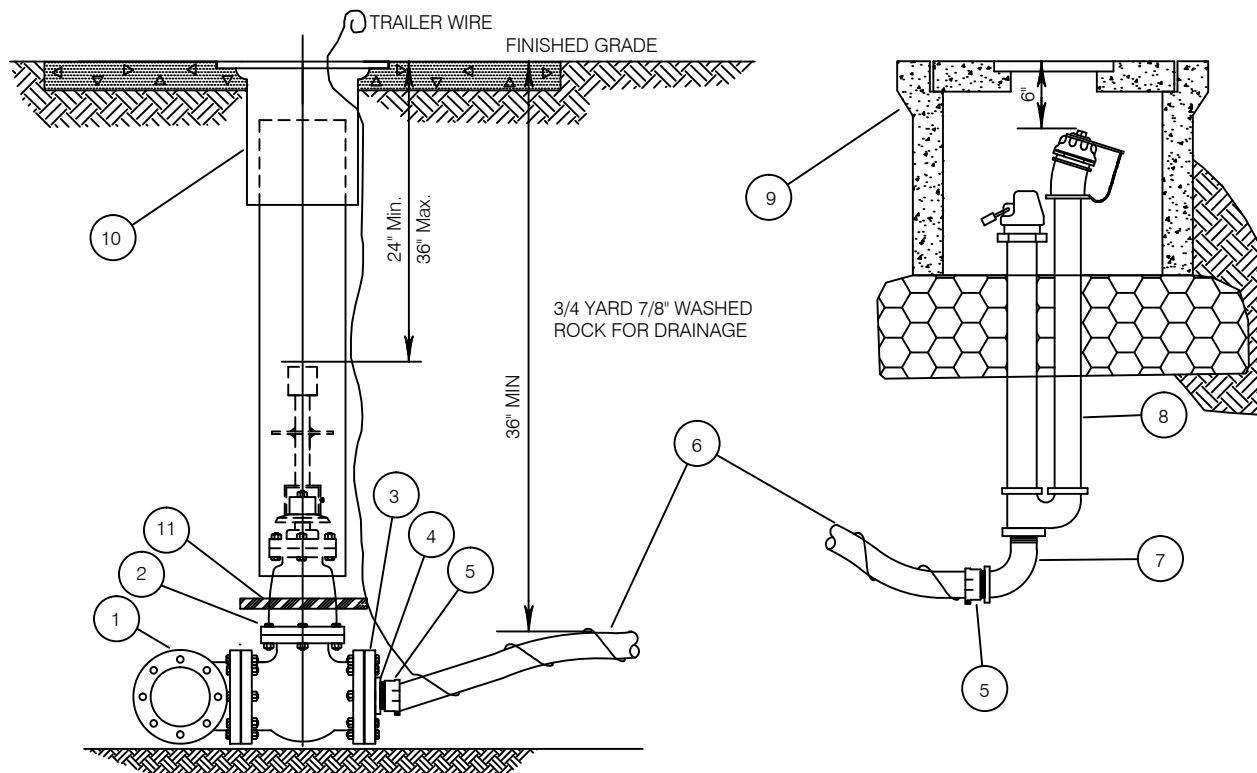
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City Engineer

HYDRANT RUN OVER
50' LENGTH
NEW INSTALLATION

Standard
Detail

547

Revision Date
Nov, 2013



DETAIL NOTES:

- 1 DUCTILE IRON TEE WITH 4" BRANCH, MJxFL (ON NEW MAINS). TAPPING TEE W/4" RANCH, FL (ON EXISTING MAINS).
- 2 4" GATE VALVE, FL x FL (SEE SECTION 5-10.6)
- 3 4" REDUCING COMPANION FLANGE WITH 2" TAP.
- 4 2" POLYETHYLENE SERVICE LINE W/10 GAGE SOLID CORE COATED COPPER WIRE WRAPPED AROUND THE PIPE AND EXTENDING 12" OUT OF VALVE BOX, SEE DETAIL 527.
- 5 COUPLING, 2" MALE IRON PIPE THREAD BY 2" PACK JOINT (COMPRESSION FITTING) WITH STAINLESS STEEL INSERTS. AY MCDONALD #74753-33 OR APPROVED EQUAL.
- 6 2" P.E. 200 PSI. WITH NO SPLICES.
- 7 2" STREET ELL, BRASS, MALE IRON PIPE THREAD BY FEMALE IRON PIPE THREAD.
- 8 BLOWOFF HYDRANT, KUPFFERLE FOUNDRY NO 78 OR EQUAL BRONZE TO BRONZE DESIGN, SERVICEABLE FROM ABOVE WITH OUTLET EXPOSED, 2-1/2" NST OUTLET, LOCKING CAP ON OPERATOR NUT.
- 9 MID STATES MSBCF 1730-12 OR APPROVED EQUAL.
- 10 SEE STD DETAIL 527
- 11 SEATTLE STYLE VALVE CUSHION IF IN ROADWAY, SEE STD DETAIL 528.

NO LEAD ON ALL BRASS FITTINGS.



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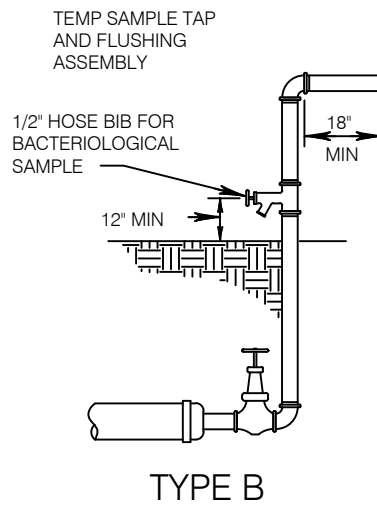
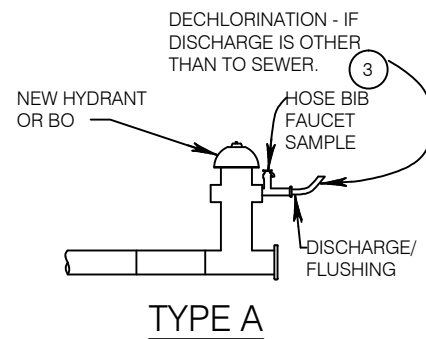
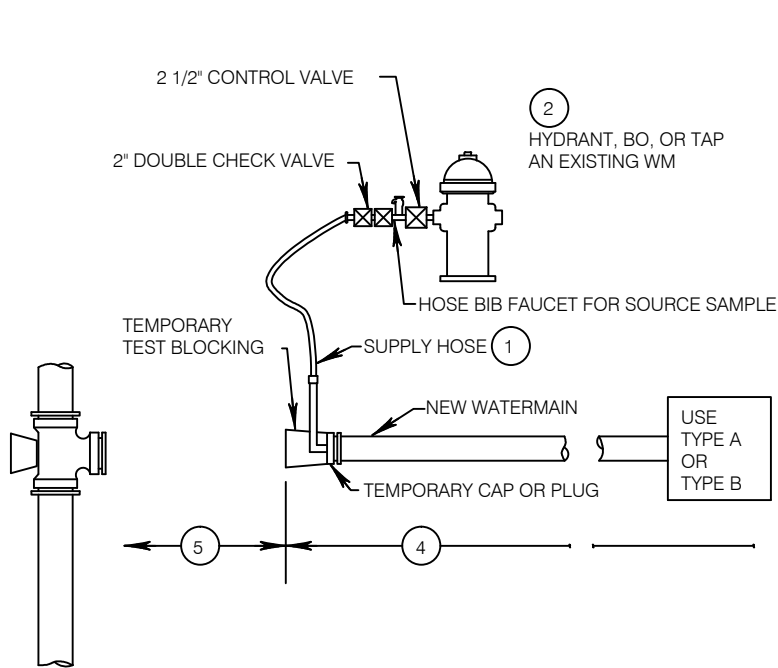
[Signature]
City Engineer

**2" BLOWOFF
ASSEMBLY**

Standard
Detail

550

Revision Date
Jun, 2015



DETAIL NOTES:

- 1 CLEAN POTABLE WATER HOSE ONLY.
- 2 HYDRANT PERMIT REQUIRED. REFER TO STD DETAIL 592.
- 3 CHECK WITH SEWER UTILITY BEFORE DISCHARGE TO SEWERS.
- 4 INSTALLED BY CONTRACTOR.
- 5 CONTRACTOR FURNISHED.

NOTES:

1. ALL EXCAVATION SHALL PROVIDE A MINIMUM OF 1' CLEAR AROUND PIPE AND FITTINGS. THESE PLAN FOR DUCTILE IRON PIPE AND CAST IRON PIPE WATERMAINS 12 INCH OR SMALLER DIA. OTHER SIZES AND TYPES SEE PROJECT DRAWINGS.
2. CONTRACTOR TO DETERMINE ALIGNMENT AND GRADE OF EXISTING FACILITY PRIOR TO INSTALLING NEW WATERMAIN.
3. ALL EXCAVATION, PIPE, FITTINGS (EXCEPT AS NOTED BELOW), OTHER MATERIAL, BACKFILL, COMPACTION, AND STREET RESTORATION BY CONTRACTOR. ALL MATERIALS TO BE ON JOB SITE PRIOR TO SHUTDOWN OF EXISTING MAIN.
4. WATERMAIN WITH PLAIN ENDS.
5. MECHANICAL JOINT SLEEVE, WITH SPACER CUT TO FIT GAP - FURNISHED AND INSERTED AT TIME OF CONNECTION.
6. TAPPING SLEEVE AND TAPPING VALVE FURNISHED AND INSTALLED BY THE CONTRACTOR.
7. APPLIES TO PIPES 4" THROUGH 12". ALL LARGER SIZES TO BE DETERMINED ON A CASE BY CASE BASIS.
8. MECHANICAL JOINT SLEEVE FURNISHED AND INSTALLED BY CONTRACTOR.



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City Engineer

**TEMPORARY
CONNECTION
FLUSHING/TESTING**

Standard
Detail

552

Revision Date
Feb, 2012

REQUIRED OPENINGS TO FLUSH PIPELINES*
(40-PSI RESIDUAL PRESSURE)

PIPE SIZE INCHES	FLOW RE- QUIRED TO PRODUCE 2.5-FPS VELOCITY GPM	ORIFICE SIZE INCHES	HYDRANT OUTLET NOZZLES	
			NUMBER	SIZE INCHES
4	100	15/16	1	2 1/2
6	220	1 3/8	1	2 1/2
8	390	1 7/8	1	2 1/2
10	610	2 5/16	1	2 1/2
12	880	2 13/16	1	2 1/2
14	1,200	3 1/4	2	2 1/2
16	1,565	3 5/8	2	2 1/2
18	1,980	4 3/16	2	2 1/2

*With 40 psi residual pressure, a 2 1/2 inches hydrant outlet nozzle will discharge approximately 1,000 gpm and a 4 1/2 inches hydrant nozzle will discharge approximately 2,500 gpm. As an alternative to 2 1/2 fps flushing, section of 16 inches or larger diameter may be prepared for disinfection by mechanical cleaning methods approved by the City Engineer.

REFER TO BOTHELL DESIGN AND CONSTRUCTION STANDARDS
SECTION 5-19.9 FLUSHING AND TESTING.



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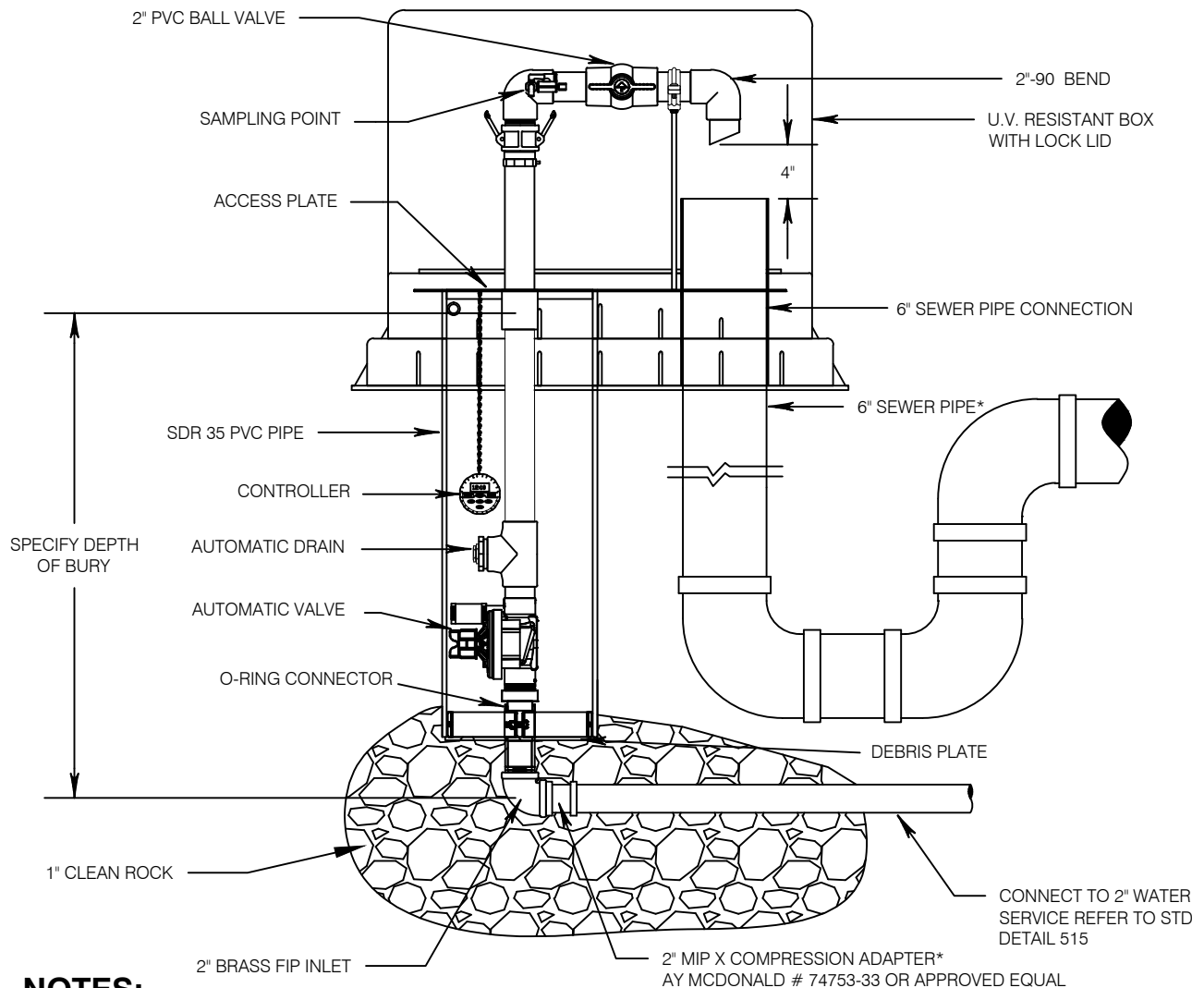
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City Engineer

FLUSHING TABLE

Standard
Detail

553

Revision Date
Feb, 2012



NOTES:

1. AUTOMATIC FLUSHING DEVICE SHALL HAVE A 2" BRASS FIP INLET, LEADING VERTICALLY INTO A 2" AUTOMATIC SOLENOID VALVE.
2. AUTOMATIC SOLENOID VALVE SHALL HAVE AN INTERNAL, SELF-CLEANING DEBRIS SCREEN, AND HAVE A 220 PSI RATING.
3. EACH UNIT SHALL BE FURNISHED WITH A STAND-ALONE VALVE CONTROLLER. VALVE CONTROLLER WILL NOT REQUIRE A SECOND HAND-HELD DEVICE FOR PROGRAMMING.
4. CONTROLLER MUST HAVE MINIMUM OF 9 POSSIBLE FLUSHING CYCLES PER DAY. SHALL BE SUBMERSIBLE TO 12 FEET, OPERATE WITH 9 VOLT BATTERY AND HAVE RESIN-SEALED ELECTRICAL COMPONENTS.
5. SOLENOID SHALL HAVE NO LOOSE PARTS WHEN REMOVED FROM VALVE. EACH UNIT SHALL HAVE A SINGLE-VALVE, ALL BRASS, SAMPLING POINT.
6. REMOVAL OF 2" SOLENOID VALVE SHALL BE POSSIBLE VIA AN O-RING CONNECTOR LOCATED UNDER THE VALVE. AFTER REMOVAL OF STAINLESS STEEL ACCESS PLATE.
7. VALVE ASSEMBLY SHALL BE HOUSED IN A PVC ENCLOSURE AND EACH UNIT SHALL BE SELF-DRAINING, NON-FREEZING, ALL ABOVE-GROUND COMPONENTS SHALL BE CONTAINED WITHIN A UV-RESISTANT LOCKING COVER, AS MANUFACTURED BY KUPFERLE FOUNDRY COMPANY MODEL#9800-A ST... LOUIS, MO. 1-800-231-3990, OR APPROVED EQUAL.
8. REFER TO DETAIL 602 FOR SIDE SEWER CONNECTION
9. NO LEAD ON ALL BRASS FITTINGS

* = BY OTHERS



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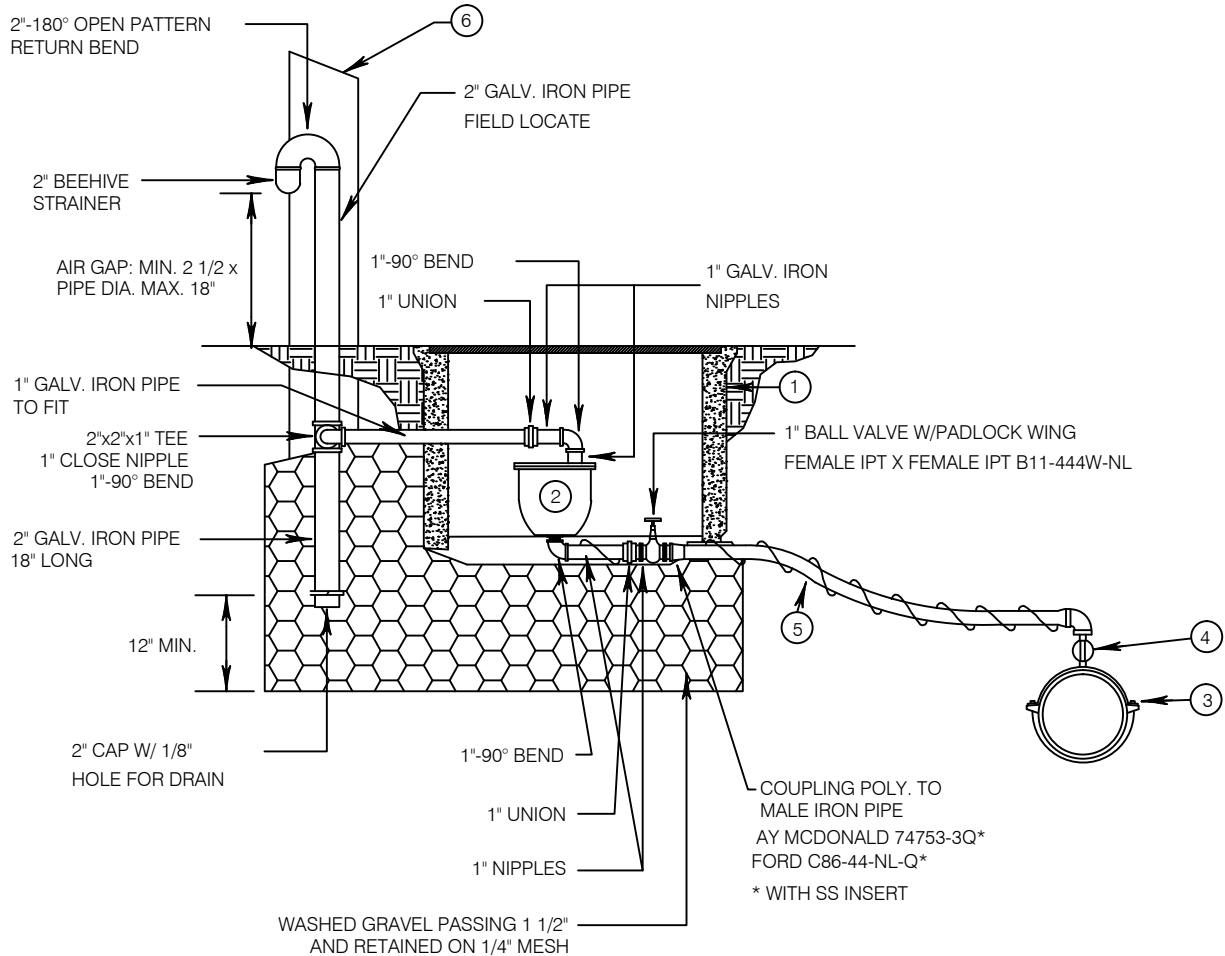
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City Engineer

**AUTOMATIC
FLUSHING UNIT**

Standard
Detail

554

Revision Date
Jun, 2015



DETAIL NOTES:

- (1) (2) MID STATES 1730-12 WITH (1) 1730 DI RDR LID OR APPROVED EQUAL.
- (2) AIR AND VACUUM VALVE ASSEMBLY APCO No.143-C OR VAL-MATIC No.201-C OR CRISPIN U-10.
- (3) ROMAC EPOXY/NYLON COATED SADDLE 101NS FOR SINGLE STAINLESS STEEL STRAP AND 202NS WITH 1" IPT UP TO 8" PIPE USE SINGLE STAINLESS STEEL STRAP, 10" AND ABOVE USE DUAL STAINLESS STEEL STRAP SADDLE.
- (4) 1" CORPORATION STOP, I.P. x I.P. FORD FB 500-4 -NL MIPT X MIPT OR A.Y. McDONALD CORP-STOP #73131B OR APPROVED EQUAL.
- (5) 1" POLYETHYLENE SERVICE LINE W/NO SPLICES (USE 200 PSI GRADE PE 3408) W/10 GAGE COATED COPPER WIRE WRAPPED AROUND THE PIPE
- (6) CONCRETE VALVE MARKING POST (REFER TO STD DETAIL 529)

NOTES:

1. ALL FITTINGS TO BE BRASS - NO LEAD UNLESS OTHERWISE NOTED.
2. 2" GALVANIZED PIPE ABOVE GRADE TO BE PAINTED WITH TWO COATS RUSTOLEUM HIGH GLOSS WHITE PAINT.
3. AIR & VACUUM RELEASE VALVE ASSEMBLY MUST BE INSTALLED AT HIGHEST POINT OFFLINE. IF HIGH POINT FALLS IN A LOCATION WHERE ASSEMBLY CANNOT BE INSTALLED, PROVIDE ADDITIONAL DEPTH OF LINE TO CREATE HIGH POINT AT A LOCATION WHERE ASSEMBLY CAN BE INSTALLED.
4. SUPPLY MARKING POST IN ACCORDANCE STD DETAIL 529.



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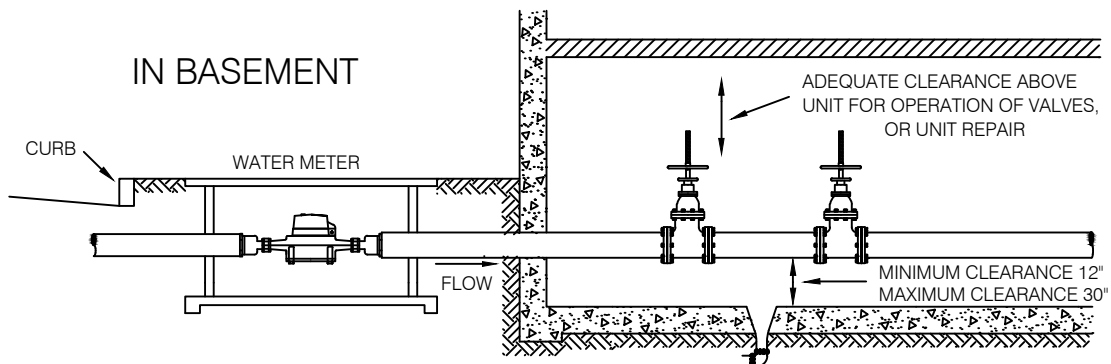
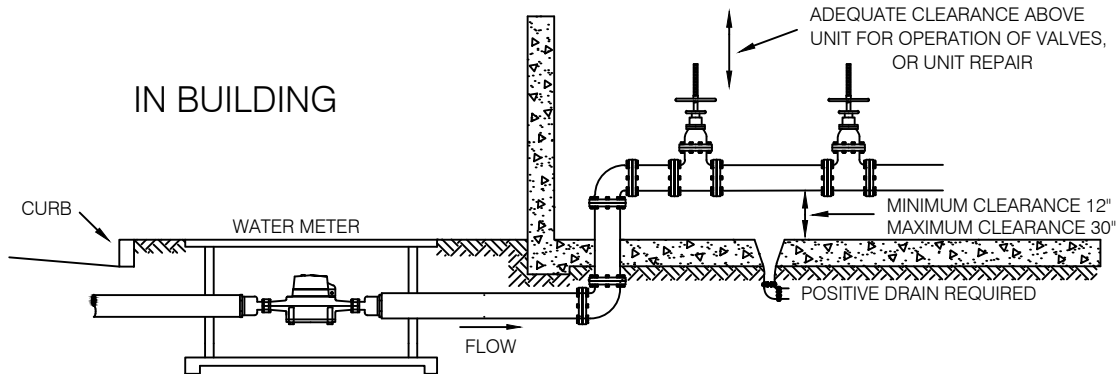
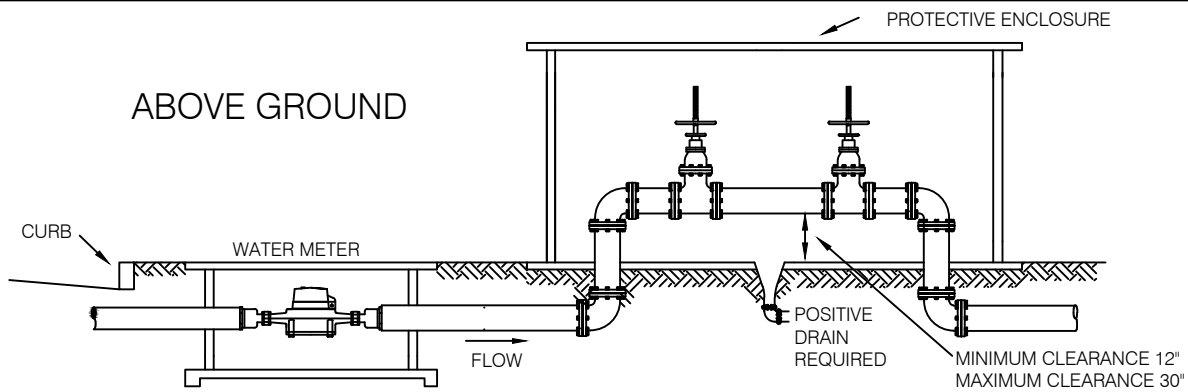
City Engineer

**1" AIR AND VACUUM
RELEASE VALVE
ASSEMBLY**

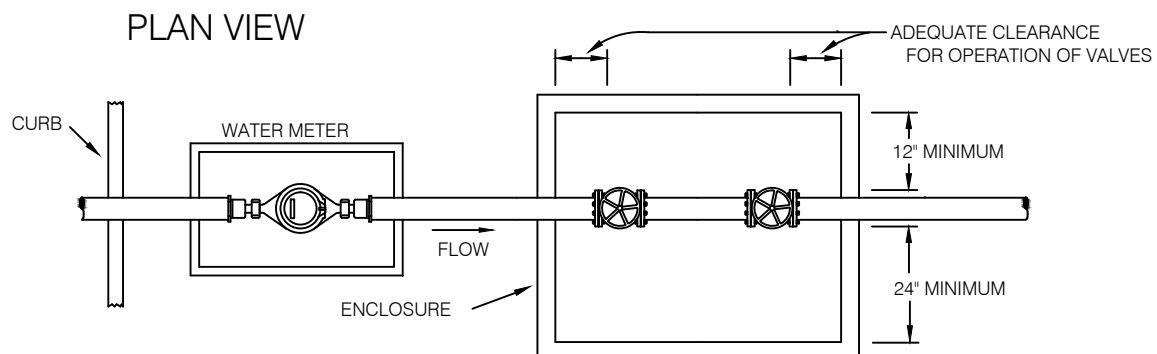
Standard
Detail

564

Revision Date
Jun, 2015



POSITIVE DRAIN REQUIRED. IF THERE IS NO POSITIVE DRAIN. SEE SUMP PUMP DETAILS 593.
SUMP PUMP MUST APPROVED BY CITY ENGINEER CASE BY CASE.



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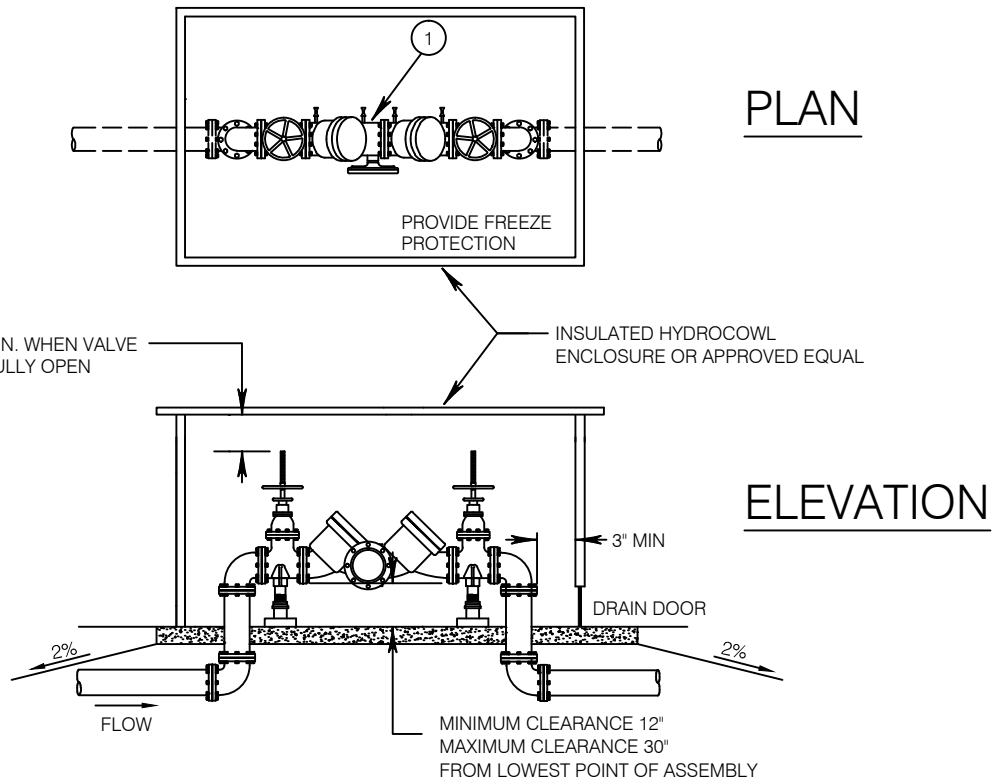
Approved By:
[Signature]
City Engineer

**TYPICAL INSTALLATION
WITH MINIMUM
CLEARANCES**

Standard
Detail

570

Revision Date
Feb, 2012



DETAIL NOTE:

- ① STATE APPROVED REDUCED PRESSURE PRINCIPLE BACK FLOW ASSEMBLY.

NOTES :

1. BASE PENETRATIONS TO BE SEALED WITH A WATERTIGHT GROUT, WATERPROOF MASTIC, OR FLEXIBLE SEALANT.
2. ACCESS TO BE CENTERED OVER ASSEMBLY.
3. EACH ASSEMBLY SHALL BE EQUIPPED WITH FOUR RESILIENT SEATED TEST COCKS WITH PLUGS INSTALLED, (FINGER TIGHT).
4. ENCLOSED RP DEVICES ARE REQUIRED TO MEET SPECIFIC CRITERIA - REVIEWED ON A CASE BY CASE BASIS.
5. PRESSURE RELIEF PORTS MUST BE KEPT CLEAN AND IN GOOD WORKING ORDER, AND BE ABLE TO FREELY DISCHARGE TO THE ATMOSPHERE.
6. A MINIMUM OF A 12" CLEARANCE IS REQUIRED BETWEEN THE LOWEST POINT OF THE ASSEMBLY AND THE BOTTOM OF THE ENCLOSURE (MAXIMUM 30")
7. TEE AND A GATE VALVE REQUIRED ON CONNECTION TO MAINLINE.
8. THE R.P.B.A. CHOSEN MUST BE ON THE MOST RECENT WA. STATE APPROVAL LISTING. THE R.P.B.A. MUST BE TESTED BY A WA. STATE CERTIFIED BACK FLOW ASSEMBLY TESTER AT THE TIME OF INSTALLATION, ANNUALLY, AND WHEN MOVED OR REPAIRED.
9. ALL INSTALLATIONS MUST MEET MANUFACTURER'S SPECIFICATIONS AND MEET THE MINIMUM STANDARDS OF THE UNIFORM PLUMBING CODE AND MUST CONFORM TO THE REQUIREMENTS AND GUIDELINES OUTLINED BY THE NATIONAL FIRE PROTECTION ASSOCIATION.



City of Bothell
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Approved By:

City Engineer

**RP BACKFLOW
ASSEMBLY
≥ 3" DOMESTIC
AND IRRIGATION**

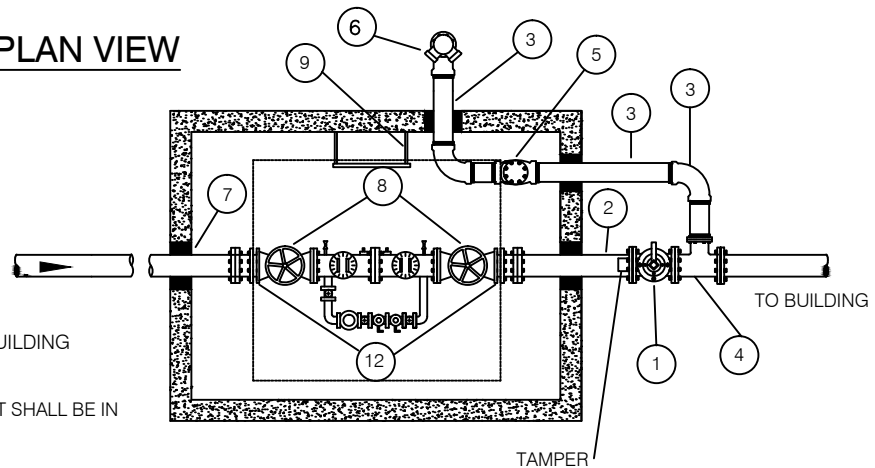
Standard
Detail

571

Revision Date
Feb, 2012

UTILITY VAULT CO. COVER		
SIZE	MODEL	COVER
2 1/2"	644	64-2-332P
3"	644	64-2-332P
4"	575	57TL-2-332P
6"	577	57TL-2-332P
8"	4484	4484-TL2-332P
10"	5106	5106-TL3-332

PLAN VIEW

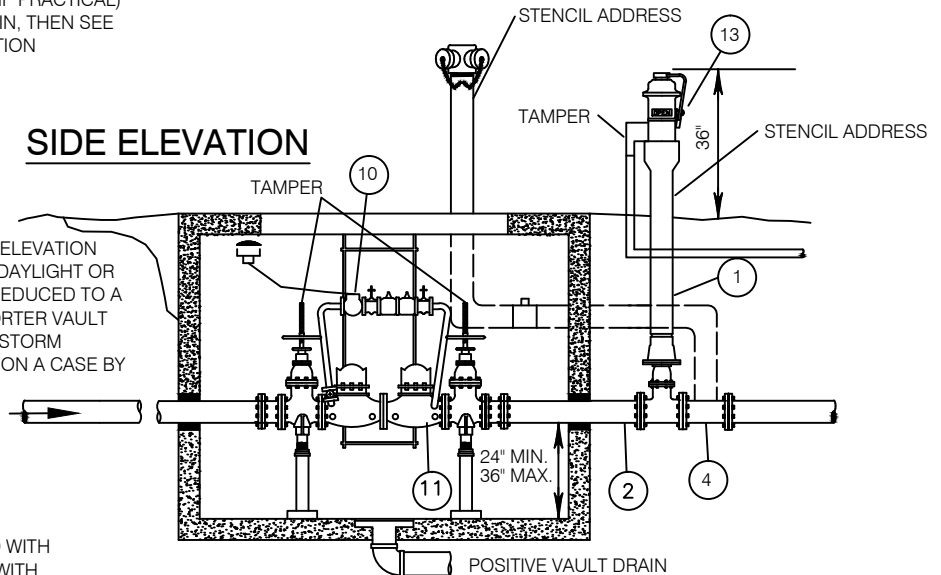


NOTES:

1. FIRE SERVICE PIPINGS FROM MAIN TO BUILDING SHALL BE RESTRAINED.
2. PROVISIONS FOR DRAINAGE OF THE VAULT SHALL BE IN THE FOLLOWING ORDER OF PRECEDENCE:
 - A) VAULT DRAIN TO DAYLIGHT
 - B) VAULT DRAIN TO STORM DRAIN SYSTEM (IF PRACTICAL)
 - C) IF NO POSSIBLE MEANS OF GRAVITY DRAIN, THEN SEE STD DETAIL 593 FOR SUMP PUMP INSTALLATION

SIDE ELEVATION

PROVIDE 24" MINIMUM AND 36" MAXIMUM CLEARANCE BETWEEN VAULT FLOOR AND BOTTOM OF BACKFLOW ASSEMBLY. WHERE ELEVATION OF VAULT FLOOR IS TOO LOW TO DRAIN TO DAYLIGHT OR STORM SYSTEM, THIS CLEARANCE CAN BE REDUCED TO A MINIMUM OF 12", IF SUBSTITUTION OF A SHORTER VAULT ALLOWS FLOOR TO DRAIN TO DAYLIGHT OR STORM SYSTEM (APPROVED BY THE CITY ENGINEER ON A CASE BY CASE BASIS ONLY).



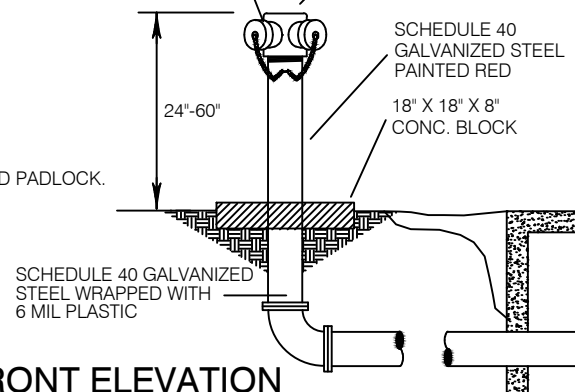
MATERIALS LIST:

- ① POST INDICATOR VALVE PAINTED RED WITH TAMPER TO FIRE ALARM PANEL AND WITH STENCILED ADDRESS
- ② CLASS 52 DI WALL PIPE FL X PE
- ③ SCHEDULE 40 GALV. STEEL WRAPPED W/6MIL PLASTIC
- ④ CLASS 52 DI TEE FL X FL
- ⑤ SWING CHECK VALVE W/BALL DRIP ASSEMBLY
- ⑥ FIRE DEPARTMENT CONNECTION (BRASS) LOCATED WITHIN 50' OF A FIRE HYDRANT. PROVIDE KNOX LOCKING CAPS. EXPOSED GALVANIZED STEEL PIPE TO BE PAINTED RED. STENCIL ADDRESS ON PAINTED PIPE.
- ⑦ ALL PIPE THROUGH VAULT WALL SHALL BE CORE DRILLED AND HAVE A "LINK SEAL" (OR APPROVED EQUAL)
- ⑧ OS & Y VALVES WITH TEMPER SWITCH TO ALARM PANEL OR CHAIN AND PADLOCK.
- ⑨ 1-GALV. LADDER WITH PULL- UP LADDER EXTENSION TO BE BOLTED TO VAULT FLOOR AND TO VAULT WALL, MOUNTED SUCH THAT LADDER IS DIRECTLY ABOVE THE EDGE OF ACCESS OPENING FOR EASE OF ACCESS. SEE STD DETAIL 590
- ⑩ 5/8 X 3/4" BADGER METER MODEL M25 (CUBIC FT. READING) ORION RADIO REMOTE DATA PROFILE TRANSMITTER FOR METAL LID. PIT MODULE MOUNTED 3" - 6" BELOW LID.
- ⑪ STATE APPROVED DOUBLE CHECK DETECTOR ASSEMBLY
- ⑫ RFCA (RESTRAINED FLANGE COUPLING ADAPTER).
- ⑬ CUTTABLE PADLOCK WITH KEY IN KNOX BOX

⑥ FIRE DEPARTMENT CONNECTION

2-1/2" FIRE DEPARTMENT INLET CONNECTION BRASS (NOT PAINTED)

RAISED LETTERS "AUTO SPRINKLER"



FRONT ELEVATION



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Approved By:

[Signature]
City Engineer

**FIRE SPRINKLER
DOUBLE CHECK
DETECTOR
ASSEMBLY W/FDC**

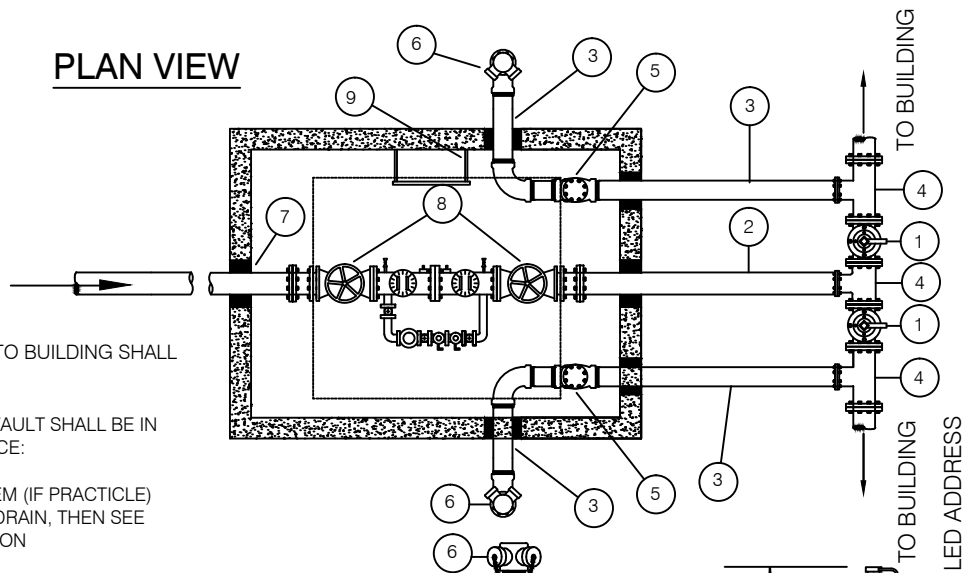
Standard
Detail

573

Revision Date
Nov, 2013

UTILITY VAULT CO.		
SIZE	MODEL	COVER
2 1/2"	644	64-2-332P
3"	644	64-2-332P
4"	575	57TL-2-332P
6"	577	57TL-2-332P
8"	4484	4484-TL2-332P
10"	5106	5106-TL3-332

PLAN VIEW

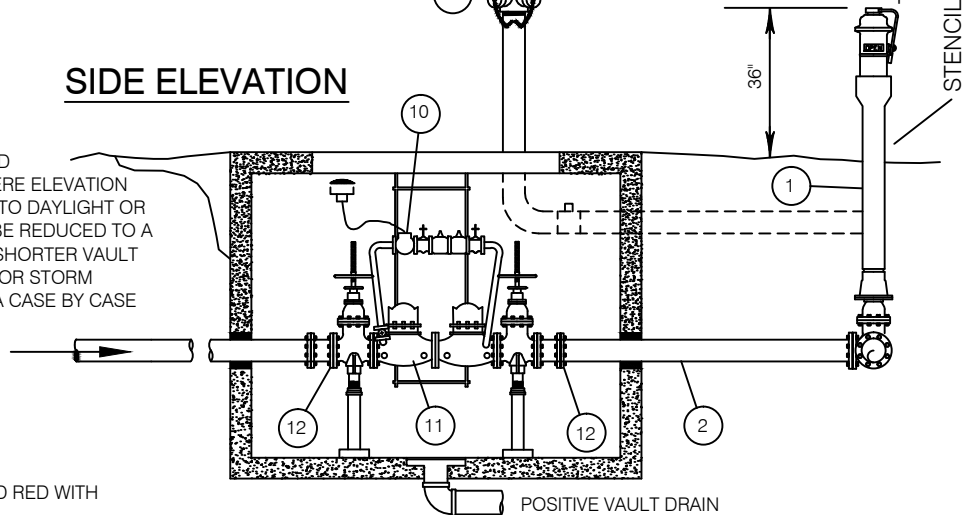


NOTES:

1. FIRE SERVICE PIPINGS FROM MAIN TO BUILDING SHALL BE RESTRAINED.
2. PROVISIONS FOR DRAINAGE OF THE VAULT SHALL BE IN THE FOLLOWING ORDER OF PRECEDENCE:
A) VAULT DRAIN TO DAYLIGHT
B) VAULT DRAIN TO STORM DRAIN SYSTEM (IF PRACTICLE)
C) IF NO POSSIBLE MEANS OF GRAVITY DRAIN, THEN SEE DETAIL 593 FOR SUMP PUMP INSTALLATION

SIDE ELEVATION

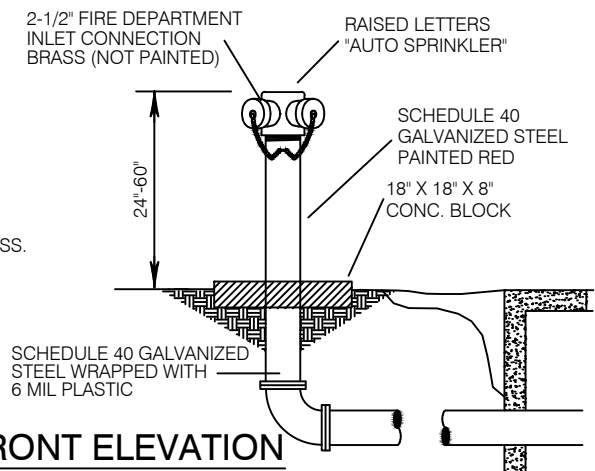
PROVIDE 24" MINIMUM AND 36" MAXIMUM CLEARANCE BETWEEN VAULT FLOOR AND BOTTOM OF BACKFLOW ASSEMBLY. WHERE ELEVATION OF VAULT FLOOR IS TOO LOW TO DRAIN TO DAYLIGHT OR STORM SYSTEM, THIS CLEARANCE CAN BE REDUCED TO A MINIMUM OF 12", IF SUBSTITUTION OF A SHORTER VAULT ALLOWS FLOOR TO DRAIN TO DAYLIGHT OR STORM SYSTEM (APPROVED BY THE UTILITY ON A CASE BY CASE BASIS ONLY).



MATERIALS LIST:

- ① POST INDICATOR VALVE PAINTED RED WITH STENCILED ADDRESS
- ② CLASS 52 DI WALL PIPE FL X PE
- ③ SCHEDULE 40 GALV. STEEL WRAPPED W/6MIL PLASTIC
- ④ CLASS 52 DI TEE FL X FL
- ⑤ SWING CHECK VALVE W/BALL DRIP ASSEMBLY
- ⑥ FIRE DEPARTMENT CONNECTION
- ⑦ ALL PIPE THROUGH VAULT WALL SHALL BE CORE DRILLED AND HAVE A "LINK SEAL" (OR APPROVED EQUAL)
- ⑧ OS & Y VALVES
- ⑨ 1-GALV. LADDER WITH PULL-UP LADDER EXTENSION TO BE BOLTED TO VAULT FLOOR AND TO VAULT WALL, MOUNTED SUCH THAT LADDER IS DIRECTLY ABOVE THE EDGE OF ACCESS OPENING FOR EASE OF ACCESS. SEE DETAIL 590
- ⑩ 5/8" X 3/4" BADGER METER MODEL M25 (CUBIC FT. READING) ORION RADIO REMOTE DATA PROFILE TRANSMITTER FOR METAL LID. PIT MODULE MOUNTED 3" - 6" BELOW LID.
- ⑪ STATE APPROVED DOUBLE CHECK DETECTOR ASSEMBLY
- ⑫ RFCA (RESTRAINED FLANGE COUPLING ADAPTER).

⑥-FIRE DEPARTMENT CONNECTION



FRONT ELEVATION



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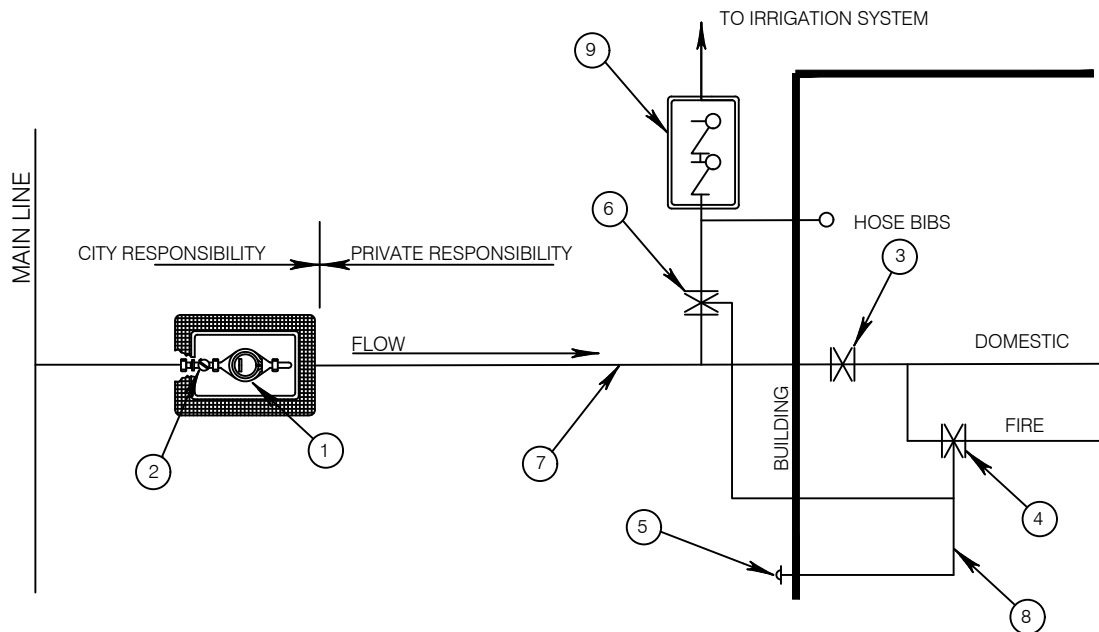
Approved By:
[Signature]
City Engineer

**FIRE SPRINKLER-DUEL
SERVICE DOUBLE
CHECK DETECTOR
ASSEMBLY W/FDC**

Standard
Detail

574

Revision Date
Nov, 2013



TYPICAL INSTALLATION

DETAIL NOTES:

- ① MINIMUM 1" WATER METER REQUIRED.
- ② LOCATION OF CUSTOMER SHUT-OFF VALVE. VALVE TO BE SET MAX. 18" TO REACH AND LOCK. PROVIDE SIGN NEXT TO VALVE "FIRE SPRINKLER SYSTEM SHUT OFF".
- ③ FIRE SPRINKLER RISER.
- ④ ELECTRIC SOLENOID TO SHUT OFF IRRIGATION SYSTEM WHEN FIRE SPRINKLER SYSTEM IS ACTIVATED.
- ⑤ MINIMUM 1 1/2" SUPPLY FROM WATER METER TO RISER.
- ⑥ FIRE SPRINKLER FLOW SWITCH ELECTRIC CIRCUIT.
- ⑦ WA STATE APPROVED DOUBLE CHECK VALVE ASSEMBLY TO BE INSTALLED PER CITY OF BOTHELL STD DETAILS 579/580.

FLOW THROUGH SYSTEM



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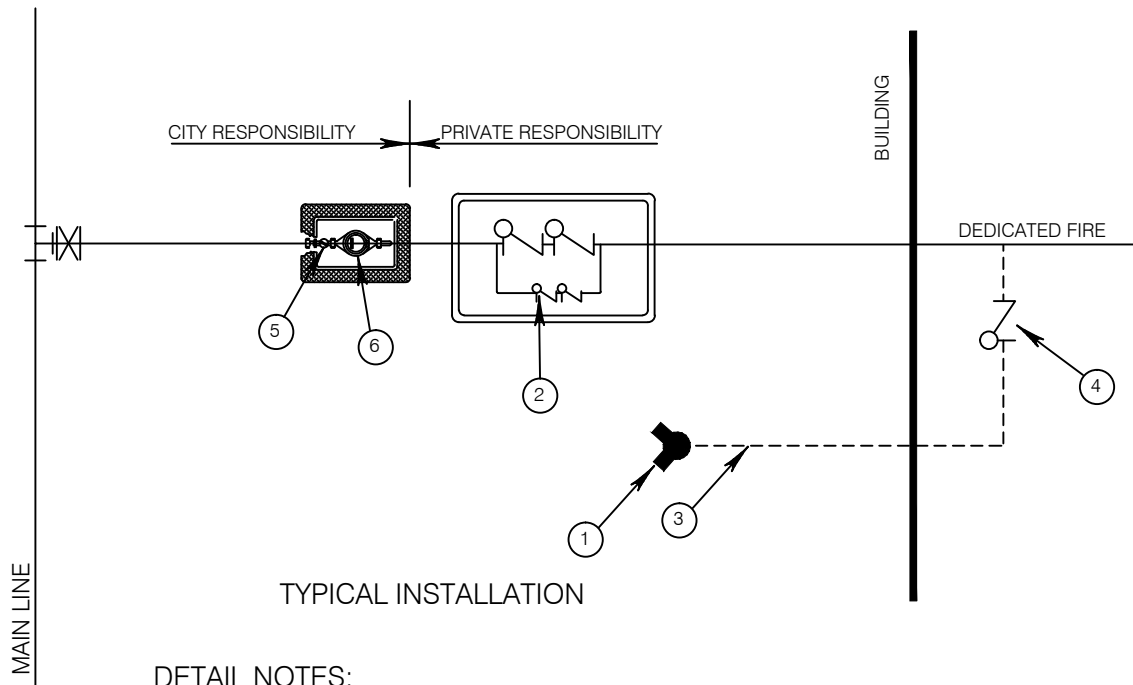
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City Engineer

**1" SINGLE FAMILY
FIRE SPRINKLER
SERVICE CONNECTION
NFPA 13D**

Standard
Detail

575A

Revision Date
Dec, 2016



DETAIL NOTES:

- ① KNOX LOCKING FIRE DEPARTMENT CONNECTION (FDC) CAPS REQUIRED.
- ② DEDICATED FIRE LINE METER WITH WA. STATE APPROVED DOUBLE CHECK VALVE ASSEMBLIES (STD DETAIL 579).
- ③ ORIENTATION AND LOCATION OF FDC TO BE INSTALLED AS DIRECTED BY THE CITY OF BOTHELL FIRE CODE OFFICIAL. FDC LOCATED WITHIN 50' OF FIRE HYDRANT.
- ④ WA. STATE APPROVED SINGLE CHECK.
- ⑤ REFER TO DETAILS 514,515 FOR WATER SERVICE ASSEMBLY.
- ⑥ METER SHALL BE SUPPLIED BY CITY OF BOTHELL.

MULTI-FAMILY RESIDENTIAL



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Approved By:

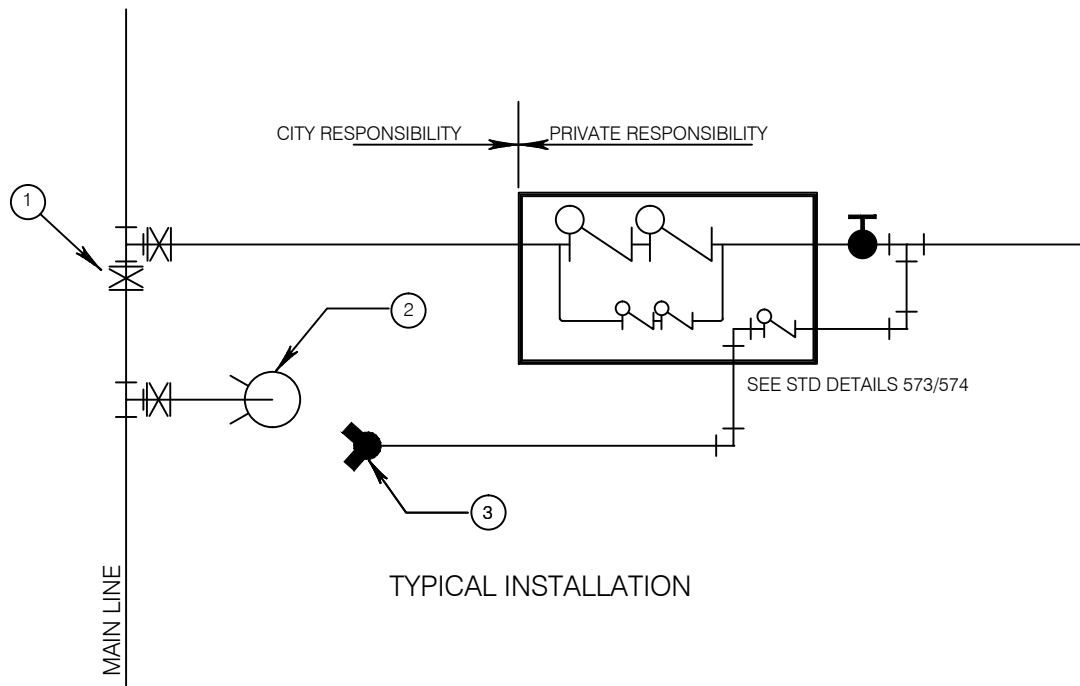
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City Engineer

1 1/2" TO 2" NFPA 13R
SPRINKLER DEDICATED
SERVICE CONNECTION

Standard
Detail

576

Revision Date
Jun, 2015



DETAIL NOTES:

- ① MAIN LINE VALVE REQUIRED BETWEEN FIRE SPRINKLER SERVICE CONNECTION AND THE HYDRANT SERVING THE FIRE DEPARTMENT CONNECTION (FDC).
- ② FIRE HYDRANT
- ③ FDC LOCATED WITHIN 50' OF FIRE HYDRANT.



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PUBLIC WORKS DEPARTMENT

Approved By:

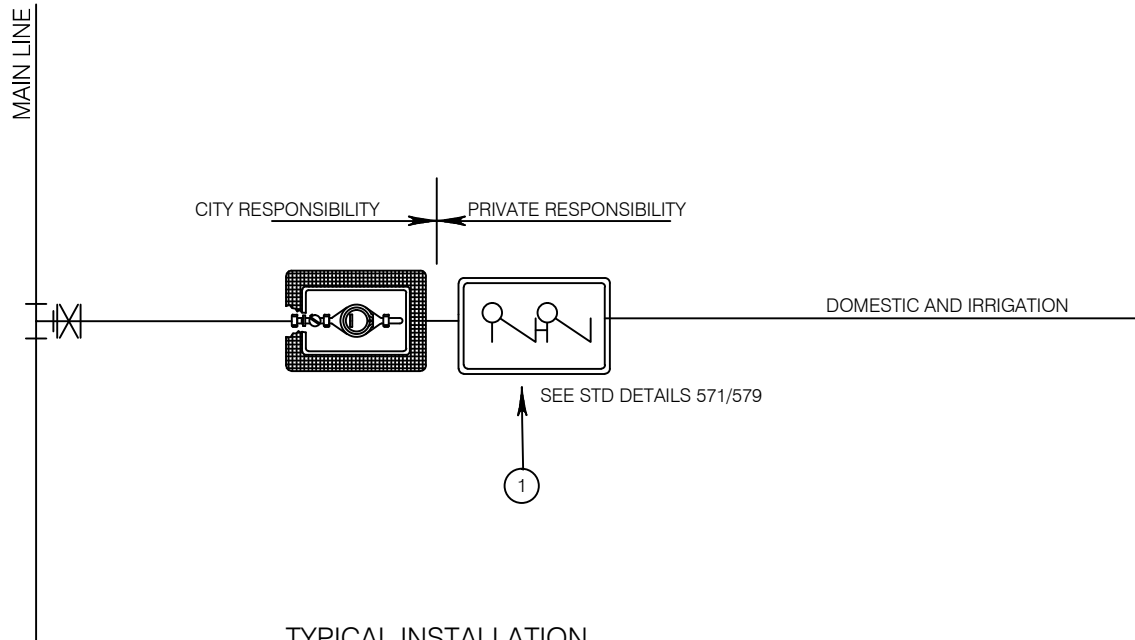
City Engineer

3" TO 10" NFPA 13D
FIRE SPRINKLER
SERVICE CONNECTION

Standard
Detail

577

Revision Date
Feb, 2012



TYPICAL INSTALLATION

NOTES:

- ① WA STATE DOUBLE CHECK VALVE ASSEMBLY OR REDUCED PRESSURE BACKFLOW ASSEMBLY, WHICH EVER IS MOST APPROPRIATE, TO BE INSTALLED BEHIND METER SET.
- ② WA. STATE REDUCED PRESSURE BACKFLOW ASSEMBLY INSTALLED PRIOR TO ALL PROCESSES AND WHERE PLUMBING SYSTEM ENTERS THE BUILDING. ASSEMBLY MUST BE ACCESSIBLE.
- ③ NO CONNECTIONS ARE ALLOWED BETWEEN METER AND INTERNAL ASSEMBLY.



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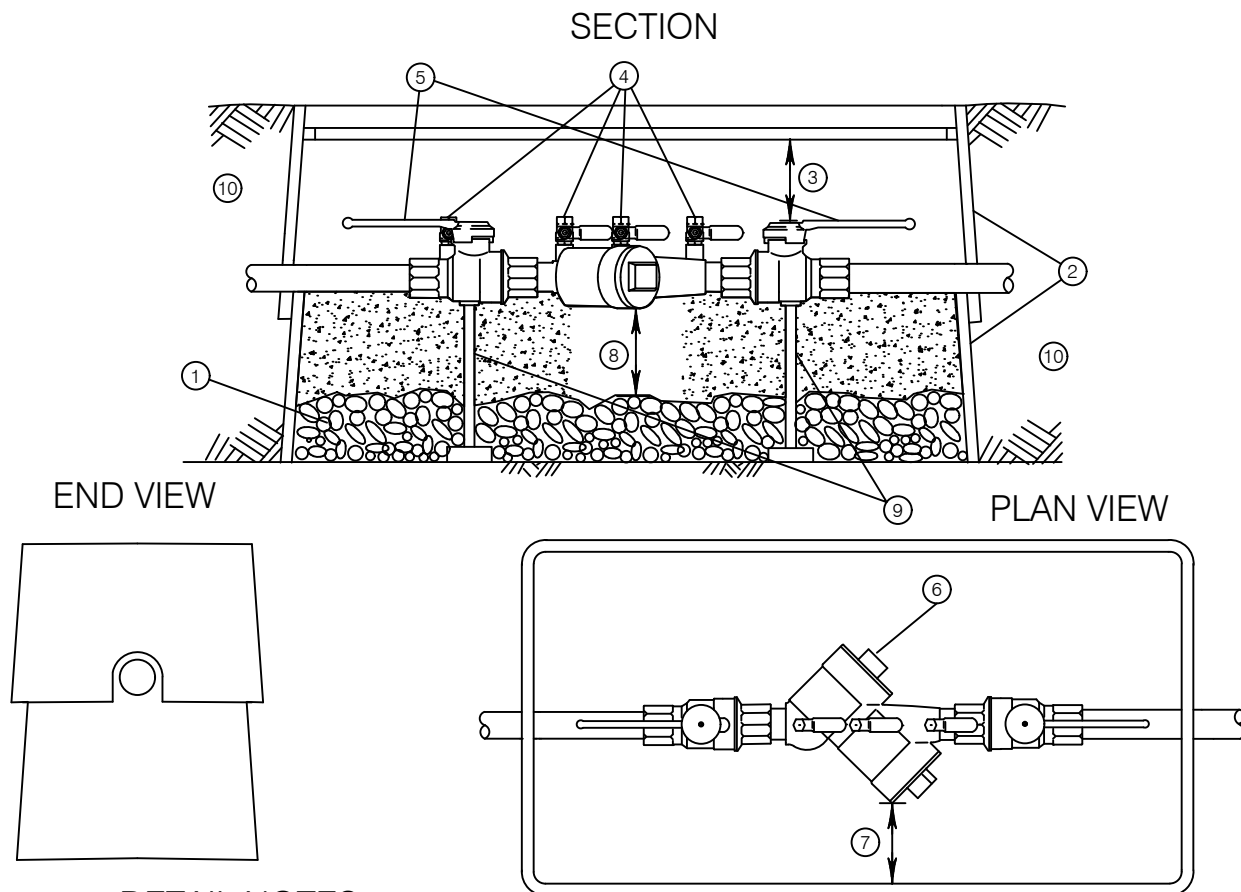
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City Engineer

**PREMISE ISOLATION
DOMESTIC AND
IRRIGATION SERVICE
CONNECTION**

Standard
Detail

578

Revision Date
Feb, 2012



DETAIL NOTES:

- ① IF DAYLIGHT DRAIN SYSTEM CANNOT BE PROVIDED, THEN INSTALL A 6" MINIMUM LAYER OF 1" ROUND WASHED GRAVEL AT THE BOTTOM OF THE BOX.
- ② TWO OLD CASTLE METER BOXES STACKED ON TOP OF EACH OTHER OR APPROVED EQUAL.
FOR 3/4" - 1" USE 1324-12 WITH ONE 1324 DI RDR LID.
FOR 1 1/2" - 2 1/2" USE TWO 1730-12 WITH ONE 1730 DI RDR LID.
- ③ A MINIMUM DISTANCE OF 12" BETWEEN THE UNDERSIDE OF THE LID AND THE HIGHEST POINT OF THE DEVICE IS REQUIRED.
- ④ THE DEVICE MUST BE EQUIPPED WITH FOUR RESILIENT SEATED TEST COCKS WITH PLUGS INSTALLED. THE ASSEMBLY MUST ALSO BE INSTALLED WITH THE TEST COCKS FACING UP OR TO ONE SIDE.
- ⑤ THE DEVICE MUST ALSO BE EQUIPPED WITH TWO RESILIENT SEATED SHUT OFF VALVES.
- ⑥ THE DEVICE MUST BE INSTALLED HORIZONTALLY.
- ⑦ A MINIMUM DISTANCE OF 6" BETWEEN THE SIDE OF THE BOX AND THE TEST COCKS WHEN THEY ARE INSTALLED SIDEWAYS.
- ⑧ A MINIMUM DISTANCE OF 1 FOOT BETWEEN THE LOWEST POINT OF THE ASSEMBLY AND THE DRAIN ROCK, FILLED WITH FINE BARK OR SAWDUST TO PROVIDE FREEZE PROTECTION.
- ⑨ SUPPORTS WILL BE REQUIRED ON 2" AND LARGER DEVICES AS SHOWN.
- ⑩ COMPACTED STRUCTURAL FILL

NOTES:

1. THE D.C.V.A. CHOSEN MUST BE ON THE MOST RECENT WASHINGTON STATE APPROVAL LISTING.
2. THE D.C.V.A. MUST BE TESTED BY A WASHINGTON STATE CERTIFIED BACKFLOW ASSEMBLY TESTER AT THE TIME OF INSTALLATION, ANNUALLY, AND WHEN MOVED OR REPAIRED.
3. ALL INSTALLATION MUST MEET MANUFACTURER'S SPECIFICATIONS AND THE MINIMUM STANDARDS OF THE U.P.C.



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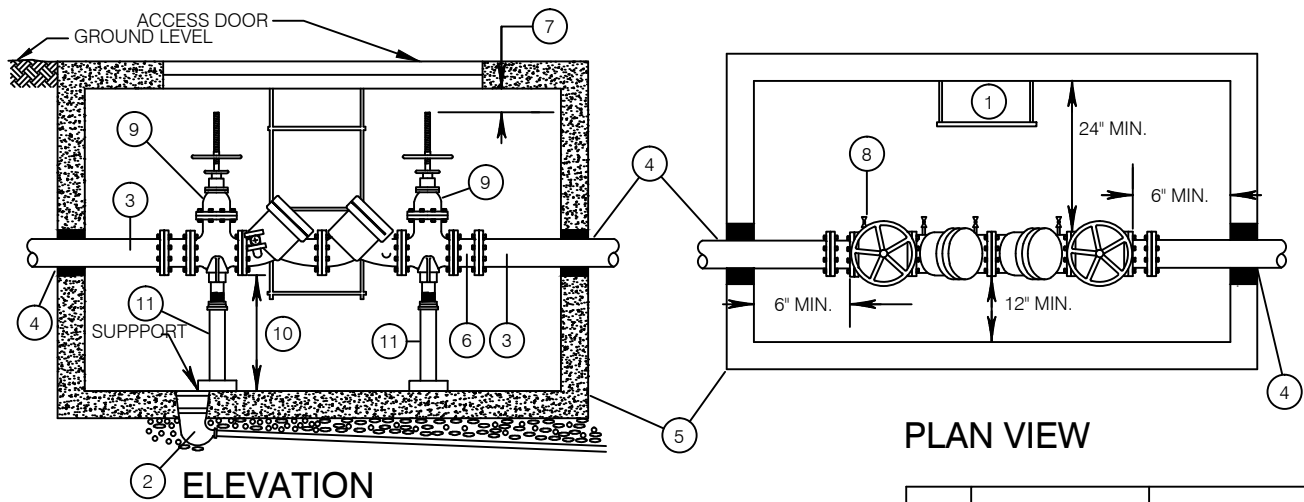
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City Engineer

**DOUBLE CHECK VALVE
ASSEMBLY IRRIGATION,
DOMESTIC or FIRE
NFPA 13 R 3/4" TO 2 1/2"**

Standard
Detail

579

Revision Date
Dec, 2016



DETAIL NOTES:

- 1 ONE GALVANIZED STEEL LADDER TO BE SECURED TO VAULT. SEE STD DETAIL 590
- 2 DRAIN SLOPE TO DAYLIGHT, WHEN POSSIBLE - (SUMP PUMP MAY BE REQUIRED).
- 3 CLASS 52 DUCTILE IRON PIPE REQUIRED (SIZED AS REQUIRED)
- 4 ALL PIPE THROUGH VAULT WALL SHALL BE CORE DRILLED AND HAVE A "LINK SEAL" (OR APPROVED EQUAL)
- 5 PRECAST CONCRETE VAULT WITH A MINIMUM OF TWO 3' X 3' DIAMOND PLATE DOORS RATED FOR H₂O LOADING, MARKED "WATER". VAULT SHALL BE EQUAL TO UTILITY VAULT CO. MODEL LISTED IN TABLE PROVIDED.
- 6 RFCA (RESTRAINED FLANGE COUPLING ADAPTER).
- 7 A MINIMUM OF 3" BETWEEN THE UNDERSIDE OF THE LID, OR VAULT, AND THE HIGHEST POINT OF VALVING AND ASSEMBLY IS REQUIRED.
- 8 THE ASSEMBLY MUST BE EQUIPPED WITH FOUR RESILIENT SEATED TEST COCKS WITH PLUGS INSTALLED.
- 9 THE ASSEMBLY MUST ALSO BE EQUIPPED WITH TWO RESILIENT WEDGE O.S. & Y. SHUT-OFF VALVES, WHICH SHALL BE COATED WITH A MINIMUM OF 4 MILS. OF EPOXY OR EQUIVALENT POLYMERIZED COATING (SEE SECT. 5-10.6)
- 10 A MINIMUM OF A 12" CLEARANCE IS REQUIRED BETWEEN THE LOWEST POINT OF THE ASSEMBLY AND THE BOTTOM OF THE VAULT.
- 11 TWO ADJUSTABLE PIPE STANCHIONS REQUIRED AND SIZED APPROPRIATELY.

SIZE	UTIL. VAULT CO. MODEL	UTIL. VAULT CO. COVER
3"	644	64-2-332P
4"	575	57TL-2-332P
6"	577	57TL-2-332P
8"	4484	4484-TL2-332P
10"	5106	5106-TL3-332

PROVISIONS FOR DRAINAGE OF THE VAULT SHALL BE IN THE FOLLOWING ORDER OF PRECEDENCE:

- A. VAULT DRAIN TO DAYLIGHT
- B. VAULT DRAIN TO STORM DRAIN SYSTEM (IF PRACTICABLE)
- C. IF NO POSSIBLE MEANS OF GRAVITY DRAIN, THEN SEE STD DETAIL 593 FOR SUMP PUMP INSTALLATION APPROVED BY CITY ENGINEER ON CASE BY CASE ONLY

NOTES:

1. ASSEMBLY TO BE CENTERED IN VAULT. TEE AND GATE VALVE REQUIRED ON CONNECTION TO MAINLINE
2. THE D.C.V.A. CHOSEN MUST BE ON THE MOST RECENT WA. STATE APPROVAL LISTING.
3. THE D.C.V.A. MUST BE TESTED BY A WA. STATE CERTIFIED BACKFLOW ASSEMBLY TESTER AT TIME OF INSTALLATION, ANNUALLY, AND WHEN MOVED OR REPAIRED.
4. ALL INSTALLATIONS MUST MEET MANUFACTURER'S SPECIFICATIONS AND MEET THE MINIMUM STANDARDS OF THE UNIFORM PLUMBING CODE.



City of Bothell

City of Bothell
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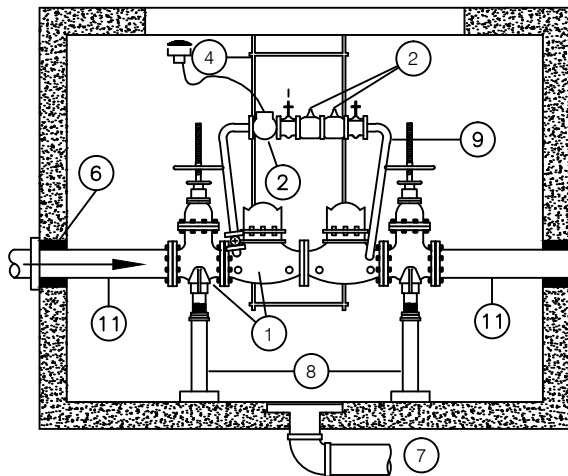
City Engineer

**DOUBLE CHECK VALVE
ASSEMBLY FOR
IRRIGATION &
DOMESTIC 3" TO 4"**

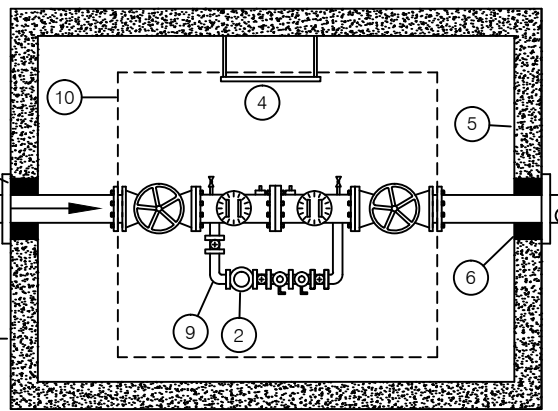
Standard
Detail

581

Revision Date
Feb, 2012



ELEVATION



PLAN VIEW

NOTES:

1. PROVISIONS FOR DRAINAGE OF THE VAULT SHALL BE IN THE FOLLOWING ORDER OF PRECEDENCE:
 A. VAULT DRAIN TO DAYLIGHT
 B. VAULT DRAIN TO STORM DRAIN SYSTEM (IF PRACTICABLE)
 C. IF NO POSSIBLE MEANS OF GRAVITY DRAIN, THEN SEE STD DETAIL 593 FOR SUMP PUMP INSTALLATION APPROVED BY THE CITY ENGINEER ON CASE BY CASE ONLY.

2. PROVIDE 24" MINIMUM AND 36" MAXIMUM CLEARANCE BETWEEN VAULT FLOOR AND BOTTOM OF COMPOUND METER. WHERE ELEVATION OF VAULT FLOOR IS TOO LOW TO DRAIN TO DAYLIGHT OR STORM SYSTEM, THIS CLEARANCE CAN BE REDUCED TO A MINIMUM OF 12", IF SUBSTITUTION OF A SHORTER VAULT ALLOWS FLOOR TO DRAIN TO DAYLIGHT OR STORM SYSTEM (APPROVED BY THE CITY ENGINEER ON A CASE BY CASE BASIS).

3. EACH ASSEMBLY SHALL BE EQUIPPED WITH FOUR RESILIENT SEATED TEST COCKS WITH PLUGS INSTALLED, (FINGER TIGHT) ON THE MAINLINE DEVICE AND ON THE METERED BY-PASS DEVICE.

4. A MINIMUM OF A 12" CLEARANCE IS REQUIRED BETWEEN THE DEVICE AND THE BOTTOM OF THE ENCLOSURE.

5. TEE AND A GATE VALVE REQUIRED ON CONNECTION TO MAINLINE.

6. THE D.C.D.A. CHOSEN MUST BE ON THE MOST RECENT WA. STATE APPROVAL LISTING.

7. THE D.C.D.A. MUST BE TESTED BY A WA. STATE CERTIFIED BACK FLOW ASSEMBLY TESTER AT THE TIME OF INSTALLATION, ANNUALLY, AND WHEN MOVED OR REPAIRED.

8. ALL INSTALLATIONS MUST MEET MANUFACTURER'S SPECIFICATIONS AND MEET THE MINIMUM STANDARDS OF THE UNIFORM PLUMBING CODE AND MUST CONFORM TO THE REQUIREMENTS AND GUIDELINES OUTLINED BY THE NATIONAL FIRE PROTECTION ASSOCIATION.

SIZE	UTIL. VAULT CO. MODEL	UTIL. VAULT CO. COVER
2-1/2"	644	64-2-332P
3"	644	64-2-332P
4"	575	57TL-2-332P
6"	577	57TL-2-332P
8"	4484	4484-TL2-332P
10"	5106	5106-TL3-332

MATERIALS LIST:

- ① STATE APPROVED DOUBLE CHECK DETECTOR ASSEMBLY
- ② 5/8 X 3/4" BADGER METER MODEL M25 (CUBIC METER READING) (ORION REMOTE DATA PROFILE TRANSMITTER)
- ③ SET SCREW RETAINER GLANDS
- ④ ONE GALVANIZED STEEL LADDER TO BE SECURED TO VAULT. SEE STD DETAIL 590
- ⑤ CONCRETE VAULT WITH A MINIMUM OF (2) 3'x3' DIAMOND PLATE DOORS RATED FOR H2O LOADING, MARKED "WATER". VAULT SHALL BE EQUAL TO UTILITY VAULT CO. MODEL LISTED IN TABLE
- ⑥ ALL PIPE THROUGH VAULT SHALL BE CORE DRILLED AND HAVE A "LINK-SEAL" (OR APPROVED EQUAL)
- ⑦ DRAIN, SLOPE TO DAYLIGHT WHERE APPLICABLE
- ⑧ TWO ADJUSTABLE PIPE STANCHIONS
- ⑨ ALL PLUMBING FOR BY-PASS TO BE COPPER AND BRASS.
- ⑩ ACCESS TO BE CENTERED OVER ASSEMBLY
- ⑪ CL. 52 D.I., M.J.



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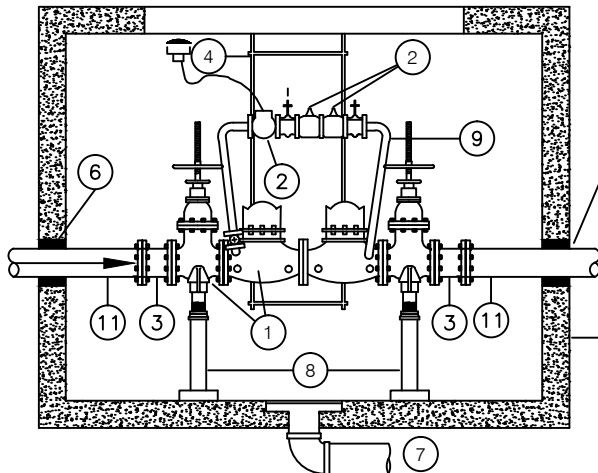
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City Engineer

**DOUBLE CHECK
DETECTOR ASSEMBLY
FIRE LINE
2"**

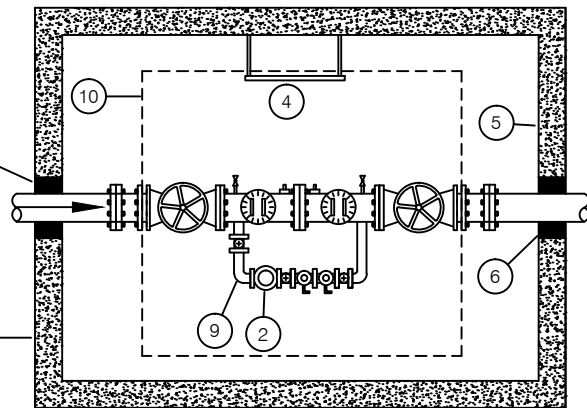
Standard
Detail

585

Revision Date
Feb, 2012



ELEVATION



PLAN VIEW

NOTES:

1. PROVISIONS FOR DRAINAGE OF THE VAULT SHALL BE IN THE FOLLOWING ORDER OF PRECEDENCE:
A. VAULT DRAIN TO DAYLIGHT
B. VAULT DRAIN TO STORM DRAIN SYSTEM (IF PRACTICABLE)
C. IF NO POSSIBLE MEANS OF GRAVITY DRAIN, THEN SEE STD DETAIL 593 FOR SUMP PUMP INSTALLATION APPROVED BY THE CITY ENGINEER ON CASE BY CASE ONLY.

2. PROVIDE 24" MINIMUM AND 36" MAXIMUM CLEARANCE BETWEEN VAULT FLOOR AND BOTTOM OF COMPOUND METER. WHERE ELEVATION OF VAULT FLOOR IS TOO LOW TO DRAIN TO DAYLIGHT OR STORM SYSTEM, THIS CLEARANCE CAN BE REDUCED TO A MINIMUM OF 12", IF SUBSTITUTION OF A SHORTER VAULT ALLOWS FLOOR TO DRAIN TO DAYLIGHT OR STORM SYSTEM (APPROVED BY THE UTILITY ON A CASE BY CASE BASIS ONLY).

3. EACH ASSEMBLY SHALL BE EQUIPPED WITH FOUR RESILIENT SEATED TEST COCKS WITH PLUGS INSTALLED, (FINGER TIGHT) ON THE MAINLINE DEVICE AND ON THE METERED BY-PASS DEVICE.

4. A MINIMUM OF A 12" CLEARANCE IS REQUIRED BETWEEN THE DEVICE AND THE BOTTOM OF THE ENCLOSURE.

5. TEE AND A GATE VALVE REQUIRED ON CONNECTION TO MAINLINE.

6. THE D.C.D.A. CHOSEN MUST BE ON THE MOST RECENT WA. STATE APPROVAL LISTING.

7. THE D.C.D.A. MUST BE TESTED BY A WA. STATE CERTIFIED BACK FLOW ASSEMBLY TESTER AT THE TIME OF INSTALLATION, ANNUALLY, AND WHEN MOVED OR REPAIRED.

8. ALL INSTALLATIONS MUST MEET MANUFACTURER'S SPECIFICATIONS AND MEET THE MINIMUM STANDARDS OF THE UNIFORM PLUMBING CODE AND MUST CONFORM TO THE REQUIREMENTS AND GUIDELINES OUTLINED BY THE NATIONAL FIRE PROTECTION ASSOCIATION.

SIZE	UTIL. VAULT CO. MODEL	UTIL. VAULT CO. COVER
2-1/2"	644	64-2-332P
3"	644	64-2-332P
4"	575	57TL-2-332P
6"	577	57TL-2-332P
8"	4484	4484-TL2-332P
10"	5106	5106-TL3-332

MATERIALS LIST:

- ① STATE APPROVED DOUBLE CHECK DETECTOR ASSEMBLY
- ② 5/8" X 3/4" BADGER METER MODEL M25 (CUBIC METER READING) (ORION REMOTE DATA PROFILE TRANSMITTER)
- ③ RFCA (RESTRAINED FLANGE COUPLING ADAPTER).
- ④ ONE GALVANIZED STEEL LADDER TO BE SECURED TO VAULT. SEE STD DETAIL 590
- ⑤ CONCRETE VAULT WITH A MINIMUM OF TWO 3'x3' DIAMOND PLATE DOORS RATED FOR H₂O LOADING, MARKED "WATER". VAULT SHALL BE EQUAL TO UTILITY VAULT CO. MODEL LISTED IN TABLE
- ⑥ ALL PIPE THROUGH VAULT SHALL BE CORE DRILLED AND HAVE A "LINK-SEAL" (OR APPROVED EQUAL)
- ⑦ DRAIN, SLOPE TO DAYLIGHT WHERE APPLICABLE
- ⑧ TWO ADJUSTABLE PIPE STANCHIONS
- ⑨ ALL PLUMBING FOR BY PASS TO BE COPPER AND BRASS.
- ⑩ ACCESS TO BE CENTERED OVER ASSEMBLY
- ⑪ CL. 52 D.I., M.J.



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Approved By:

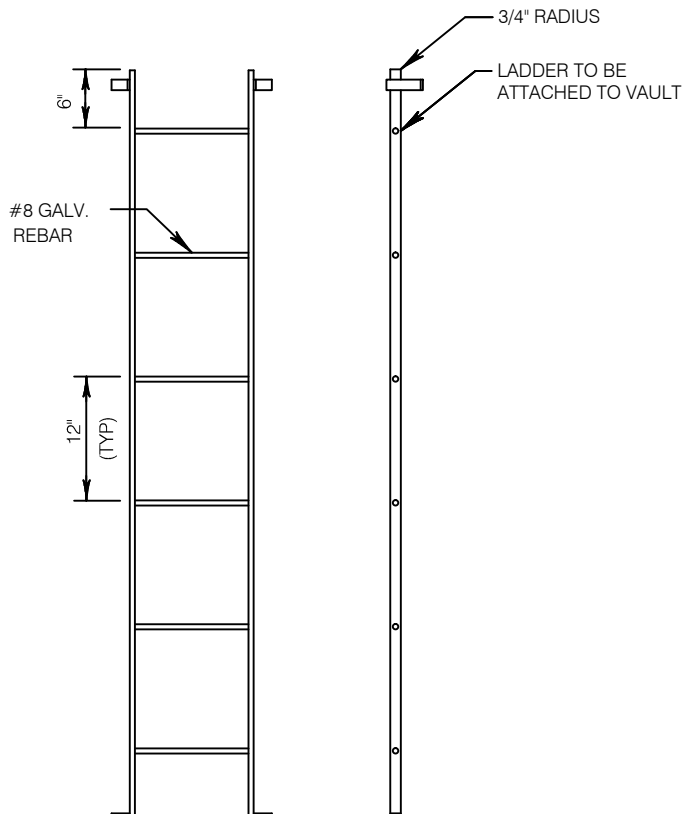
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City Engineer

**DOUBLE CHECK
DETECTOR
ASSEMBLY FIRE LINES
2 1/2" TO 10"**

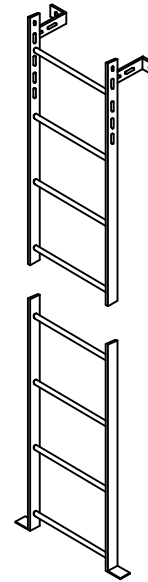
Standard
Detail

586

Revision Date
Feb, 2012

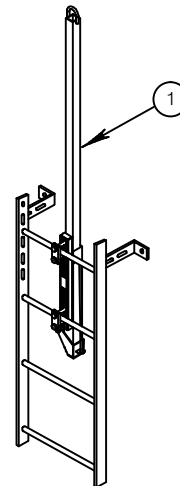


LADDER



BOLT-ON LADDER

3/4" DIA. (36 REBAR) RUNGS ON 12" CENTER
SIDE RAILS ARE 2"x5/16" FLATBAR 2 MOUNTING
BRACKETS FURNISHED HOT DIPPED GALVANIZED.



PULL-UP EXTENDER

DETAIL NOTE:

- ① PULL-UP LADDER EXTENSION, BILCO LU4 LADDER UP (OR APPROVED EQUAL)

NOTES:

1. LEGS MAY BE PARALLEL OR APPROXIMATELY RADIAL AT OPTION OF MANUFACTURER, EXCEPT THAT ALL STEPS IN ANY VAULT SHALL BE SIMILAR.
2. PENETRATION OF OUTER WALL BY A LEG IS PROHIBITED



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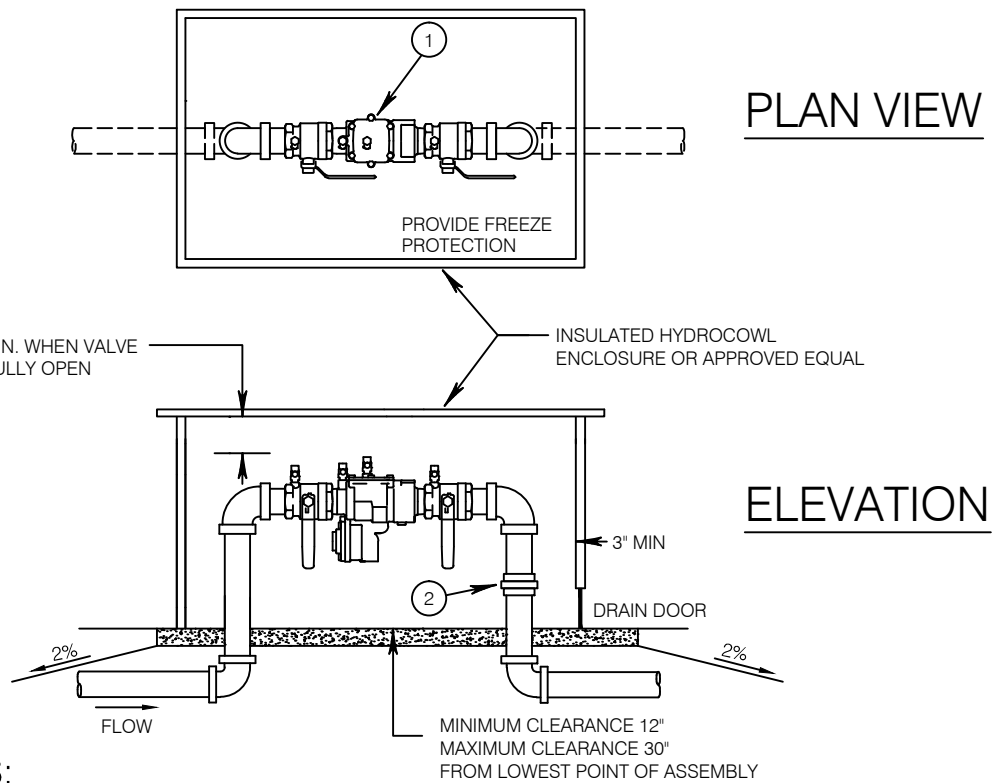
Approved By:
[Signature]
City Engineer

LADDER DETAIL WITH
PULL-UP EXTENDER

Standard
Detail

590

Revision Date
Feb, 2012



DETAIL NOTES:

- ① STATE APPROVED REDUCED PRESSURE PRINCIPLE BACK FLOW ASSEMBLY.
- ② UNION FITTING.

NOTES :

1. BASE PENETRATIONS TO BE SEALED WITH A WATERTIGHT GROUT, WATERPROOF MASTIC, OR FLEXIBLE SEALANT.
2. ACCESS TO BE CENTERED OVER ASSEMBLY.
3. EACH ASSEMBLY SHALL BE EQUIPPED WITH FOUR RESILIENT SEATED TEST COCKS WITH PLUGS INSTALLED, (FINGER TIGHT).
4. ENCLOSED RP DEVICES ARE REQUIRED TO MEET SPECIFIC CRITERIA - REVIEWED ON A CASE BY CASE BASIS.
5. PRESSURE RELIEF PORTS MUST BE KEPT CLEAN AND IN GOOD WORKING ORDER, AND BE ABLE TO FREELY DISCHARGE TO THE ATMOSPHERE.
6. A MINIMUM OF A 12" CLEARANCE IS REQUIRED BETWEEN THE LOWEST POINT OF THE ASSEMBLY AND THE BOTTOM OF THE ENCLOSURE (MAXIMUM 30")
7. TEE AND A GATE VALVE REQUIRED ON CONNECTION TO MAINLINE.
8. THE R.P.B.A. CHOSEN MUST BE ON THE MOST RECENT WA. STATE APPROVAL LISTING. THE R.P.B.A. MUST BE TESTED BY A WA. STATE CERTIFIED BACK FLOW ASSEMBLY TESTER AT THE TIME OF INSTALLATION, ANNUALLY, AND WHEN MOVED OR REPAIRED.
9. ALL INSTALLATIONS MUST MEET MANUFACTURER'S SPECIFICATIONS AND MEET THE MINIMUM STANDARDS OF THE UNIFORM PLUMBING CODE AND MUST CONFORM TO THE REQUIREMENTS AND GUIDELINES OUTLINED BY THE NATIONAL FIRE PROTECTION ASSOCIATION.



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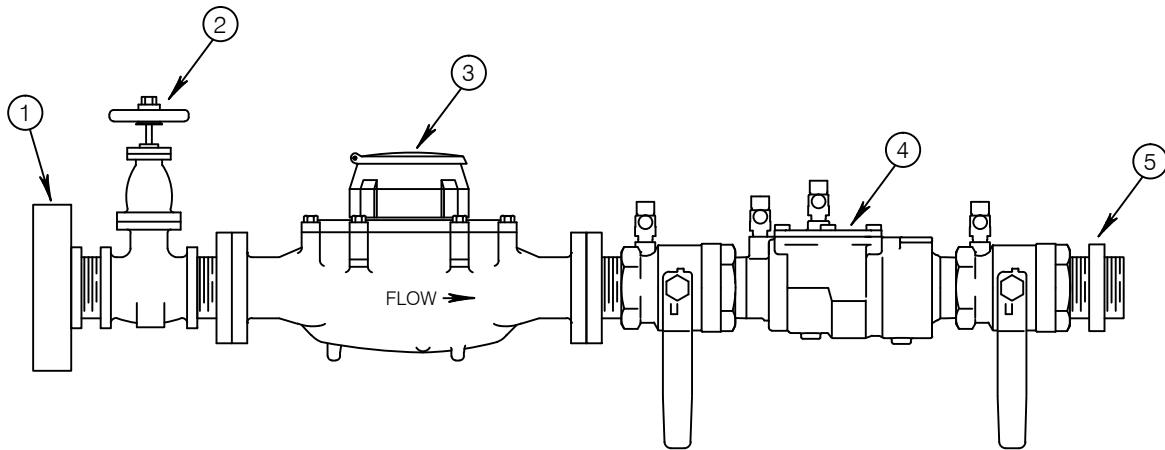
City Engineer

**RP BACKFLOW
ASSEMBLY
(UP TO 2") DOMESTIC
& IRRIGATION**

Standard
Detail

591

Revision Date
Feb, 2012



DETAIL NOTES:

- ① 2½" HYDRANT SWIVEL CONNECTION.
- ② 2" GATE VALVE: BRASS.
- ③ METER: BADGER: SEE TABLE FOR MODEL NUMBER INFORMATION*.
- ④ DOUBLE CHECK VAVLE ASSEMBLY (DCVA): FEBCO MODEL 850 MASTER SERIES*
- ⑤ 2" ADAPTER: IPS x HOSE, BRASS.

* (OR APPROVED EQUAL)

METER SIZE	MODEL NUMBER
¾"	= M25
1"	= M70
1½"	= M120
2"	= M170

NOTES :

- 1. MUST HAVE CURRENT TEST REPORT ON DCVA.
- 2. ALL FITTINGS TO BE CONSTRUCTED OF BRASS.
- 3. VALVE HANDLES ON DCVA TO BE REMOVED PRIOR TO INSTALLATION.



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Approved By:

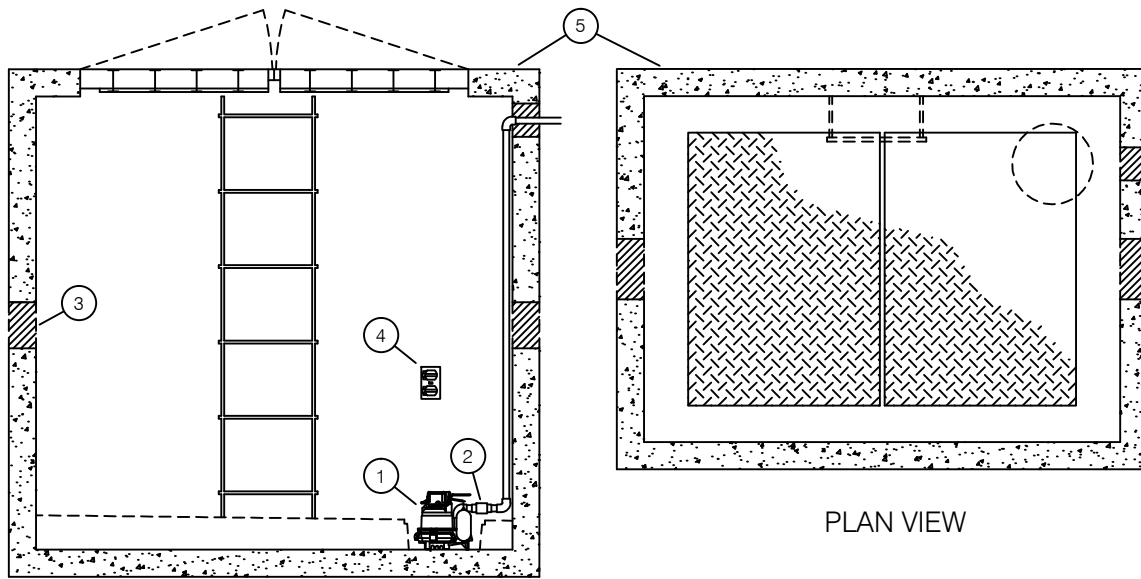
City Engineer

HYDRANT METER
WATER MAKE-UP

Standard
Detail

592

Revision Date
Feb, 2012



ELEVATION

PLAN VIEW

SIZE	UTILITY VAULT CO. MODEL	UTILITY VAULT CO. "LW" COVER
2½"	644	64-2-332P
3"	644	64-2-332P
4"	575	57TL-2-332P
6"	577	57TL-2-332P
8"	4484	4484-TL2-332P
10"	5106	5106-TL3-332

NOTES:

- ALL MATERIALS SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR.
- IF NOT ABLE TO POSITIVELY DRAIN, USE VAULT WITH A 5" MINIMUM DEPTH SUMP AND DOUBLE LEAF "LW" LIGHTWEIGHT ALUMINUM HATCH COVER. ALUMINUM LID TO COME FROM FACTORY SHALL BE SET IN CONCRETE.
- VAULT SHALL BE SOLID-WALL CONSTRUCTED WITH NO KNOCKOUTS.
- VAULT FLOOR TO SLOPE FROM 6" TO 5" WITH A MINIMUM SUMP DEPTH OF 5".
- SUMP PUMP TO BE INSTALLED IN VAULT SUMP AND PIPING TO BE INSTALLED IN A DIRECT PATH TO THE POINT OF DISCHARGE WITH CHECK VALVE PLUMBED IN-LINE.
- PIPING FOR SUMP PUMP TO BE ANCHORED TO VAULT WITH 1½" CONDUIT CLAMPS.
- ALL PIPE THROUGH VAULT SHALL BE CORE DRILLED AND HAVE A LINK-SEAL MODULAR SEAL (OR APPROVED EQUAL).
- WIRE FOR SUMP PUMP SECURED TO VAULT WALL.

MATERIALS LIST:

- 1½" SUMP PUMP: ZOELLER MODEL #M53 SYMPLEX (OR APPROVED EQUAL).
- 1½" CHECK VALVE: ZOELLER MODEL #30-0164 (OR APPROVED EQUAL UNLESS FREEZING IS A PROBLEM).
- "LINK SEAL": MODULAR SEAL (OR APPROVED EQUAL).
- GFCI PROTECTED OUTLET FOR SUMP PUMP.
- UTILITY VAULT: SEE TABLE FOR APPROVED SIZES AND MODELS.



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PUBLIC WORKS DEPARTMENT

Approved By:

City Engineer

SUMP PUMP

Standard
Detail

593

Revision Date
Nov, 2013